

**ENVIRONMENTAL ASSESSMENT**  
**FOR**  
**DEMOLITION OF 76 BUILDINGS**  
**ON**  
**REDSTONE ARSENAL, ALABAMA**

**U.S. ARMY AVIATION AND MISSILE COMMAND**  
**REDSTONE ARSENAL, ALABAMA**

**AUGUST 1997**

August xx, 1997

**FINDING OF NO SIGNIFICANT IMPACT (FNSI)  
FOR  
ENVIRONMENTAL ASSESSMENT OF THE  
DEMOLITION OF 76 BUILDINGS ON REDSTONE ARSENAL, AL**

**BACKGROUND:** Redstone Arsenal (RSA) is located in Madison County, southwest and adjacent to the city of Huntsville, Alabama. The Arsenal occupies approximately 38,000 acres of land and employs approximately 21,500 government and contractor personnel. The Arsenal has identified 76 buildings on the Arsenal for demolition. These buildings have been utilized for the production of a variety of munitions over the last 40 years and are now considered excess to current military needs.

**PURPOSE AND NEED OF THE PROPOSED ACTION:** The purpose of the proposed action is to demolish, in place, 76 pre- and post- World War II and Cold War Era buildings located at various sites on RSA. Several of these buildings are known to be contaminated with materials utilized in the manufacture of rocket propellants and chemical munitions during their active periods. Buildings lacking contamination would be razed by burning and/or bulldozing while buildings determined to be contaminated would have to be demolished following Alabama Department of Environmental Management (ADEM) approved methods (*e.g.* flashing). These methods are addressed in a letter from ADEM dated 18 March 1997 (**Appendix A**). The need of the proposed action is to remove the hazardous conditions presented by some of the buildings and enhance the installation's facility planning process for future construction activities in fulfillment of mission needs.

**ALTERNATIVES CONSIDERED:** The alternatives considered were the No-Action Alternative and the Selective Demolition Alternative. Under the no-action alternative, the Arsenal would not demolish the identified buildings which would have a detrimental effect on land use and health and safety issues on the Arsenal. Renovation of these buildings is not considered a cost effective alternative due to the existing contamination with explosive propellants, asbestos, and lead-based paint. The no-action alternative was not considered viable, since potential negative impacts would be expected and the buildings would continue to present a problem as they continue to deteriorate. The Selective Demolition Alternative would allow the demolition of selected buildings that have documented contamination and present the worst health and safety concerns while retaining buildings that may be renovated in a cost effective manner to extend their useful function.

**ENVIRONMENTAL EFFECTS:** Eleven broad environmental components were considered to provide a context for understanding the potential effects of the proposed action and a basis for assessing the significance of potential impacts. The areas of environmental consideration are air quality, biological resources, cultural resources, hazardous materials and waste, health and safety, infrastructure and transportation, land use, noise, geology and soils, socioeconomics, and water resources.

There would be positive, cumulative impacts anticipated to land use and health and safety as a result of demolition of the buildings as prescribed under the proposed action. Mitigation

measure(s) identified for this action are included in Chapter 5, Conclusions and Mitigations Summary.

**CONCLUSION:** The proposed action would optimize facility operations and allow better land use and decrease health and safety concerns of the buildings on the Arsenal and surrounding areas.

We found no significant environmental impacts associated with this action which would require the publication of an Environmental Impact Statement. Should you wish to review this Environmental Assessment for the Demolition of 76 Buildings on Redstone Arsenal, August XX, 1997, or comment on this action, you may contact Ms. Pam Rogers, 205-876-4162, Commander, U.S. Army Aviation and Missile Command, Attn: AMSAM-IN (Ms. Pam Rogers), Redstone Arsenal, Alabama, 35898-5020, within thirty days from the date of this publication.

DEPARTMENT OF THE ARMY  
UNITED STATES ARMY AVIATION AND MISSILE COMMAND  
REDSTONE ARSENAL, ALABAMA

FINDING OF NO SIGNIFICANT IMPACT  
FOR THE  
DEMOLITION OF 76 BUILDINGS ON REDSTONE ARSENAL

PREPARED AUGUST XX, 1997

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# **EXECUTIVE SUMMARY**

## **INTRODUCTION**

Redstone Arsenal (RSA) is located in Madison County, southwest and adjacent to the city of Huntsville, Alabama. Prior to acquisition by the Army, the land comprising the present day Arsenal was primarily used for producing cotton, corn, hay, small grain crops, and livestock. The original land was purchased in 1941-42 from 320 landowners under the Siebert Arsenal Project. RSA began as three contiguous facilities, Huntsville Arsenal, the Gulf Chemical Warfare Depot (GCWD), and the Redstone Ordnance Plant. These three facilities were constructed to manufacture, assemble, and store chemical munitions. Huntsville Arsenal, the GCWD, and the Redstone Ordnance Plant were eventually combined in 1949 into the current RSA with approximately 32,000 combined acres. Over the years, acreage has increased and decreased during various transactions. RSA currently comprises 37,910 acres (including special-use permit land) located on an approximately six mile wide by ten mile long site. (U.S. Army Missile Command, 1995)

## **DESCRIPTION OF THE PROPOSED ACTION**

The proposed action is to demolish 76 pre- and post- World War II and Cold War era buildings located in various locations across RSA. These buildings were primarily used for the manufacture of explosive/chemical munitions during their active period and are now abandoned. Several of these buildings have been found to contain residual contamination from the munitions manufacturing process. The proposed action would allow these buildings to be demolished in place to return the land for reuse in future building programs. Buildings containing residual contamination would be demolished by ADEM approved methods (e.g. flashing), non-contaminated buildings would be razed by burning and/or bulldozing.

## **METHODOLOGY**

This Environmental Assessment (EA) analyzes the potential environmental consequences of the proposed action in compliance with the National Environmental Policy Act (NEPA); Department of Defense Directive 6050.1, Environmental Effects in the United States of Department of Defense Actions; and Army Regulation 200-2, Environmental Effects of Army Actions.

Eleven environmental components were considered as a basis for assessing the significance of potential impacts. These areas are air quality, biological resources, cultural resources, hazardous materials and waste, health and safety, infrastructure and transportation, land use, noise, geology and soils, socioeconomics, and water resources.

To assess the significance of environmental impacts, a list of activities necessary to accomplish the proposed action was developed. The environmental setting was described and activities with the potential for significant environmental consequences were identified. Three levels of impacts were considered: no impact, no significant impact, and significant impact.

## **RESULTS**

This section summarizes the analyses for each of the 11 areas of environmental consideration.

**AIR QUALITY** - There would be potential, though not significant, impacts to air quality anticipated from building demolition activities under the proposed action. Activities during demolition would produce short-term, intermittent air quality impacts from fugitive dust (particulate matter) and explosive emissions associated with demolition activities. However, Federal and state National Ambient Air Quality Standards (NAAQS) concentrations would not be expected to be exceeded. Fugitive dust and explosive emissions can be controlled, and such emissions are not expected to contribute to the long-term cumulative impacts on air quality of the area. No mitigation measures are necessary as long as .....

**BIOLOGICAL RESOURCES** - Under the proposed action, the Arsenal's Natural Resources Management Plan would be used to screen demolition sites for potential impacts to biological resources and to identify U.S. Fish and Wildlife Service consultation requirements.

**Vegetation** - All of the buildings under consideration for removal are located in areas previously disturbed by construction. The existing vegetation is primarily landscape trees, shrubs, and sod. The Arsenal does not plan to remove existing large vegetation (*i.e.* trees) from areas around the buildings proposed for demolition, if such action can be avoided. Further, the Arsenal plans to revegetate the areas to sod and/or trees when the demolition and removal activities are completed. These actions would have positive, cumulative impacts to biological resources.

**Fish and Wildlife** - A variety of wildlife species are found on the Arsenal. Some of these species have the potential to be found in and around the areas slated for demolition. With the exception of some common bird and small mammal species, these areas do not currently provide suitable habitat or nesting/den locations for many species. No fishery resources are located in the vicinity of the buildings designated for possible demolition.

**Aquatic Habitats** - No significant aquatic habitats exist in the vicinity of the buildings designated for possible demolition. The proposed action would not be expected to impact any aquatic habitats or organisms.

**Threatened and Endangered Species** - *Apios priceana* (Price's potato bean), a federally listed threatened plant is in the vicinity of one building proposed for demolition but there are no species within the project limits. The contractor will be closely monitored during the demolition of that building.

**Unique Habitats** - No unique habitats have been identified in the vicinity of the buildings designated for possible demolition. The proposed action would not impact these resources.

**CULTURAL RESOURCES** - There would be potential negative impacts to cultural resources under the no-action alternative, since there would be no clearly defined plan for the restoration or maintenance of any of the 76 buildings under consideration for demolition.

**HAZARDOUS MATERIALS AND WASTE** - All of the buildings under consideration for demolition have been vacant for some time. Many of the buildings located in the former Thiokol area have been subjected to a Level "xxx" decontamination. In addition, most of these buildings (including sumps connected to the structures) contain residual amounts of explosive propellant materials. Since all of the buildings were constructed 40-50 years ago most of them still contain asbestos and/or lead-based paint. No attempts to remove these materials have been made since the buildings were vacated. Demolition debris from the buildings would potentially contain measurable amounts of these materials that must be disposed of in an appropriate manner.

**HEALTH AND SAFETY** - By contrast, there would be potential negative impacts under the no-action alternative, if the 76 buildings under consideration are not demolished.

**INFRASTRUCTURE AND TRANSPORTATION** - There are no impacts anticipated to infrastructure and transportation. There are no utility requirements expected for demolition activities and the Arsenal's existing roadway network is expected to provide suitable access to the proposed demolition sites throughout the Arsenal.

**LAND USE** - There would be positive, cumulative impacts anticipated to land use under the proposed action. The land currently occupied by the 76 buildings considered for demolition would be available for alternative uses. Demolition of the buildings would help optimize long-term land use on the Arsenal, consistent with good management practices and a long-range planning perspective.

The no-action alternative could have potential negative impacts to land use. A majority of the 76 buildings have been found to contain residual contamination from past munitions activities, have been long abandoned, and are in a state of disrepair. In addition, most of the buildings contain asbestos and lead-based paint. The no-action alternative would place a burden on the Arsenal to maintain these structures or secure them from the public to avoid liability from the hazards contained within.

**NOISE** - There would be brief periods of noise impacts anticipated from the proposed action. However, these impacts would not be considered significant. Demolition activities would generate noise during periods of demolition, which although not continuous, could be disruptive for brief periods. Buildings currently identified for demolition are not adjacent to sensitive noise receptors (such as threatened or endangered species, hospitals, or schools).

**GEOLOGY AND SOILS** - There would be no impacts anticipated to the geology or soils of the areas where the proposed action is to take place.

There is the potential for soil adjacent to the buildings to be contaminated from the materials present in the buildings during the demolition. Careful planning of the demolition activities to ensure that materials inside the buildings are completely consumed during the demolition would decrease the likelihood of the soils around the buildings from being contaminated. After demolition careful excavation of the building foundation and surrounding soil to a depth of 12 inches is recommended to completely remove potentially contaminated soil.

**SOCIOECONOMICS** - The buildings under consideration for demolition have been abandoned for some time and do not currently contribute to the socioeconomic base of the Arsenal. The proposed action to demolish the buildings is expected to have a positive impact on local socioeconomics. A number of job opportunities, from pre- and post- demolition activities would be anticipated from the proposed action. Estimates for a demolition job of this magnitude have ranged from 1 to 3 million dollars. Incidental positive impacts to socioeconomics associated with future construction projects would be expected and evaluated under separate environmental documentation for those projects.

**WATER RESOURCES** - No impacts to water resources are anticipated under the proposed action. Demolition activities would be performed in a manner and under conditions that would

ensure that byproducts of the demolition do not runoff to drainage ditches and impact water resources.

## **CONCLUSION**

Redstone Arsenal proposes to demolish 76 pre- and post- World War II and Cold War Era buildings. These buildings have been abandoned for some time and are in various states of disrepair. Additionally, some of the buildings have been found to contain residual contamination from explosive/chemical munitions manufacturing activity as well as asbestos and lead-based paint. To reduce health and safety liability issues and to free up the areas for current and future mission needs, the buildings need to be removed. The method of demolition would be based individually on whether or not the buildings have been contaminated by past activities. This document may assist in tiering future environmental documents, such as Records of Environmental Consideration (RECs), as additional buildings are identified for demolition.

No significant impacts are anticipated from implementing the proposed action. There would be positive, cumulative impacts anticipated to land use, health and safety, and socioeconomics. Mitigation measures have been identified for air quality, cultural resources, and health and safety.

Under the no-action alternative, the Arsenal would continue to monitor and maintain the buildings in their current state. The no-action alternative was not considered viable, since potential negative impacts would be expected to land use and health and safety.



## LIST OF ACRONYMS AND ABBREVIATIONS

ACM	Asbestos Containing Material
ADEM	Alabama Department of Environmental Management
ALNHP	Alabama Natural Heritage Program
AMCOM	U.S. Army Aviation and Missile Command
AR	Army Regulation
CAA	Clean Air Act
CAAA	Clean Air Act Amendments
CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CO	Carbon Monoxide
CWA	Clean Water Act
dB	Decibels
dba	A-weighted Decibels
DA	Department of the Army
DoD	Department of Defense
DOT	Department of Transportation
EA	Environmental Assessment
EPA	Environmental Protection Agency
GCWD	Gulf Chemical Warfare Department
HABS	Historic American Building Survey
HAER	Historic American Engineering Record
HAP	Hazardous Air Pollutant
HCl	Hydrochloric Acid
HTPB	Hydroxyterminated Polybutadiene
MICOM	U.S. Army Missile Command
MSFC	Marshall Space Flight Center
MSL	Mean Sea Level
NAAQS	National Ambient Air Quality Standards
NASA	National Aeronautics and Space Administration
NEPA	National Environmental Policy Act
NO <sub>2</sub>	Nitrogen Oxide
NPDES	National Pollutant Discharge Elimination System
NRHP	National Register of Historic Places
NWI	National Wetlands Inventory
O <sub>3</sub>	Ozone
OSHA	Occupational Safety and Health Administration
Pb	Lead
PCB	Polychlorinated Biphenyls
PM-10	Particulate matter with aerodynamic diameter less than or equal to 10 microns
RACM	Regulated Asbestos Containing Material
RCRA	Resource Conservation and Recovery Act
REC	Record of Environmental Consideration
ROI	Region of Influence
SARA	Superfund Amendments and Reauthorization Act
SCS	Soil Conservation Service
SHPO	State Historic Preservation Office
SO <sub>2</sub>	Sulfur Dioxide
SWDF	Solid Waste Disposal Facility

TLV	Threshold Limit Value
TVA	Tennessee Valley Authority
USDA	United States Department of Agriculture
USFWS	United States Fish and Wildlife Service
WNWR	Wheeler National Wildlife Refuge

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## 1.0 INTRODUCTION

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The National Environmental Policy Act (NEPA); Council on Environmental Quality (CEQ) regulations implementing NEPA (40 Code of Federal Regulations [CFR] 1500-1508); Department of Defense (DoD) Directive 6050.1, *Environmental Effects in the United States of Department of Defense Actions*; and Army Regulation (AR) 200-2, *Environmental Effects of Army Actions*, which implements these laws and regulations, direct DoD and Army officials to consider environmental consequences when authorizing or approving Federal actions. This EA analyzes the environmental consequences of the demolition of 76 buildings on RSA.

Section 1.0 of this document discusses the background and briefly describes the proposed action, introduces the purpose and need for the action, notes the location(s) of the project, and highlights issues raised during the assessment process. Section 2.0 discusses project alternatives, including the proposed action. Section 3.0 describes the affected environment at the location(s) of the proposed action. Section 4.0 assesses the potential environmental consequences of implementing the proposed action and alternatives and highlights cumulative impacts and mitigation measures for each resource. Section 5.0 presents the conclusions of the assessment and a recap of the mitigation measures for selected resources. Section 6.0 lists preparers for this EA. Section 7.0 lists individuals and agencies consulted and the agencies, organizations, and individuals sent copies of the EA. Section 8.0 lists references used to prepare this document. Appendix A contains a copy of consultation letters from the State Historic Preservation Office (SHPO) and ADEM regarding the proposed action.

References are presented in three ways. References presented after a period refer to the preceding paragraph. References presented before a period refer only to the information in that sentence. References presented within a sentence refer specifically to the fact they follow.

**1.1 BACKGROUND.** RSA is located in Madison County, southwest and adjacent to the city of Huntsville, Alabama. Prior to acquisition by the Army, the land comprising the present day Arsenal was primarily used for producing cotton, corn, hay, small grain crops, and livestock. The original land was purchased in 1941-42 from 320 landowners under the Siebert Arsenal Project. Under this project, Huntsville Arsenal and RSA were constructed to manufacture chemical munitions. The two arsenals were eventually combined in 1949 into the current RSA with approximately 32,000 combined acres. Over the years, acreage has increased and decreased during various transactions. RSA currently comprises 37,910 acres (including special-use permit land) located on an approximately six mile wide by ten mile long site. (U.S. Army Missile Command, 1995)

**1.1.1 Description of the Proposed Action.** The proposed action is to demolish in place 76 pre- and post- World War II and Cold War Era buildings located in various areas on RSA (Figure 1-1 through 1-12). These buildings have been abandoned for some time and several are known to be contaminated with materials utilized in the manufacture of explosive/chemical munitions during their active periods as well as asbestos and lead-based paint. Buildings which are determined to contain residual contamination would be demolished following ADEM approved methods (*e.g.* flashing), non-contaminated buildings would be razed by burning and/or bulldozing (ADEM 18 March 1997 letter).

**1.1.2 Purpose for the Action.** The purpose of the proposed building demolition is to remove a potential health and safety hazard and return the areas currently occupied by the buildings to a more useable status. Several of these buildings are known to have been contaminated with

materials utilized in the manufacture of rocket propellant and chemical munitions during their active periods. The demolition method utilized would be based on the contamination status of each building.

**1.1.3 Need for the Action.** RSA requires ample area to accommodate new development and growth for installation needs and mission requirements, and an obligation to provide a safe environment for installation personnel. Removal of the buildings identified in the proposed action would allow room for the reutilization of these locations in some of the prime building locations within the Arsenal. If the areas are not to be immediately utilized for building needs the areas would be available for revegetation and returned to a more naturalized condition for use by local wildlife populations, and to enhance the aesthetic value of the areas currently occupied by the unused buildings that are in a state of disrepair.

**1.1.4 Location.** The location of the majority of the 76 buildings proposed for demolition are in the North and South Plants of the area formerly occupied by the Thiokol Corporation (see location map, Figure 1-1 through 1-12). The former North Plant area contains 47 identified buildings with a combined area of 114,917 ft<sup>2</sup>. The former South Plant contains 13 buildings proposed for demolition with a total area of 44,760 ft<sup>2</sup>. The remaining 16 buildings with a combined area of 140,337 ft<sup>2</sup> are located in a variety of locations on the Arsenal.

## **1.2 RELATED ENVIRONMENTAL DOCUMENTATION.**

- *Architectural Assessment of the World War II Military and Civilian Works, U.S. Army Missile Command, Redstone Arsenal, Madison County, Alabama.* March 1997.
- *Phase I Environmental Baseline Study - Redstone Arsenal Rocket Engine Facility North Plant.* November 1996.
- *An Architectural and Historic Inventory of Buildings and Structures Dating to the Cold War-Era (1946-1989) at Redstone Arsenal, Alabama.* January 10, 1997.

**1.3 AGENCIES INVOLVED IN ENVIRONMENTAL ANALYSIS.** The Alabama State Historic Preservation Office (SHPO) has been consulted to determine their concerns regarding the proposed action (Appendix B). ADEM has also been consulted regarding the proposed action. A letter from ADEM addressing Air Pollution Control Requirements for the Demolition of Thiokol Area Structures is also included in Appendix A.

**1.4 PUBLIC INVOLVEMENT.** There is a 30-day comment period after the Notice of Availability of the EA for the Demolition of 76 Buildings on Redstone Arsenal is published in the local newspaper. Other Federal, state, and local agencies are not currently involved in the planning of this action.

There were no significant environmental issues determined through this EA process. All issues raised during the scope of the process have been identified within this assessment.

## **2.0 ALTERNATIVES INCLUDING THE PROPOSED ACTION**

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**2.1 SUMMARY OF ALTERNATIVES.** During the planning stage for the proposed action, only the no-action alternative was considered and retained. This alternative, as well as the proposed action, were assessed for potential impacts to the environment and described in the following sections.

### **2.2 DESCRIPTION OF ALTERNATIVES INCLUDING THE PROPOSED ACTION.**

**2.2.1 Alternative 1 - Proposed Action.** The proposed action is to demolish in-place 76 pre- and post- World War II and Cold War Era buildings located on RSA, Alabama. These buildings have been abandoned for some time and several are known to be contaminated with materials utilized in the manufacture of explosive/chemical munitions during their active periods as well as asbestos and lead-based paint. Buildings lacking contamination would be razed by burning and/or bulldozing while buildings determined to be contaminated would have to be demolished following Alabama Department of Environmental Management (ADEM) approved methods (*e.g.* flashing). Representative photos showing the condition of some of the buildings to be demolished at the former Thiokol North and South plants are shown in Figures 2-1 through 2-5.

**2.2.2 Alternative 2 - No-Action Alternative.** Under the no-action alternative, the Arsenal would not demolish the identified buildings which would have a detrimental effect on land use and health and safety on the Arsenal. Renovation of these buildings does not present a cost effective solution (Mark Burroughs, pers. comm.). The no-action alternative was not considered viable, since potential negative impacts would be expected to land use and health and safety and the buildings would continue to present a problem as they continue to deteriorate.

**2.2.3 Alternative 3 - Selective Demolition.** This alternative would allow the demolition of buildings determined to contain residual contamination at levels deemed to pose a threat to health and safety by burning and/or bulldozing. The buildings determined to contain low residual contamination threats would not be demolished but decontaminated and renovated. This would only be a viable alternative if renovations to the selected buildings was determined to be cost effective.





**FIGURE 2-1 THIOKOL BUILDINGS**



**FIGURE 2-2 THIOKOL BUILDINGS**





**FIGURE 2-3 THIOKOL BUILDINGS**



**FIGURE 2-4 OLD COURTROOM BUILDING**



**FIGURE 2-5 THIOKOL BUILDINGS**



## 3.0 AFFECTED ENVIRONMENT

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This section describes the environment potentially affected by the proposed action. The affected environment is described to provide a context for understanding potential impacts. Components of the affected environment that are of greater concern are described in greater detail.

Available literature was acquired and reviewed. To fill data gaps and verify and update available information, Arsenal personnel and Federal, state, and local regulatory agencies were contacted. Cited literature, telephone interviews, and referenced material are presented in Section 8.

Eleven broad environmental components were considered to provide a context for understanding the potential effects of the proposed actions and a basis for assessing the significance of potential impacts. Several of these environmental components are regulated by Federal and/or state environmental statutes, many of which set specific guidelines, regulations, and standards. These standards provide benchmarks for determining the significance of environmental impacts. The compliance status of each project area with respect to environmental requirements was included in the information collected. The areas of environmental consideration are air quality, biological resources, cultural resources, hazardous materials and waste, health and safety, infrastructure and transportation, land use, noise, geology and soils, socioeconomics, and water resources.

### 3.1 AIR QUALITY

**Region of Influence (ROI)** - The ROI for the proposed action is the land area occupied by RSA, since the buildings under consideration for demolition are located throughout the entire Arsenal.

**Affected Environment** - Existing air quality is defined through examination of air quality standards. Air quality standards are established and maintained through both state and Federal programs to protect human health and welfare. The purpose of this chapter is to identify those state and Federal programs that regulate maintenance of air quality in the area around RSA that could be affected by demolition operations. The section is divided into two parts. Part 1 addresses air quality standards potentially applicable to the demolition of buildings at RSA. Part 2 discusses regulatory requirements and work practice standards that must be adhered to during demolition in order to maintain compliance with air quality standards.

#### 3.1.1 Regulatory Overview

This regulatory overview addresses state and Federal air regulations potentially applicable to the demolition of buildings at RSA located in Huntsville. The buildings are contaminated with rocket propellant waste, hazardous chemicals, and asbestos.

The Clean Air Act (CAA) of 1970 and the Clean Air Act Amendments (CAAA) of 1990 authorize the Environmental Protection Agency (EPA) to develop programs for the control and abatement of air pollution from the construction, reconstruction or modification of air emission sources of regulated pollutants. The emphasis of the programs is to protect public health and welfare through maintenance of air quality standards for air pollutants.

EPA delegates much of its authority to administer regulations to the states, who in turn, are responsible for developing State Implementation Plans (SIP) for the maintenance of air quality. EPA has ultimate authority to approve or disapprove these plans, based on their adherence to Federal statutes. The Alabama Department of Environmental Management (ADEM) is the

regulatory authority for the state of Alabama. ADEM has adopted Federal regulations into the ADEM Administrative Code (AAC) Division 335-3.

The CAA established National Ambient Air Quality Standards (NAAQS) for criteria pollutants. (Those for which health-based standards have been developed -- carbon monoxide (CO), sulfur dioxide (SO<sub>2</sub>), nitrogen oxide (NO<sub>x</sub>), and particulate matter less than 10 microns (PM<sub>10</sub>), ozone (O<sub>3</sub>), and lead). ADEM has incorporated NAAQS into AAC Division 335-3 Chapter 1 (AAC 335-3-1). The city of Huntsville is in attainment for all criteria pollutants for which NAAQS have been established.

For air pollutants other than criteria pollutants, the State of Alabama has adopted guidelines for new air emission sources such that the emission of a substance should not cause ambient air concentrations (on public property) to exceed 1/40<sup>th</sup> of the published threshold limit value (TLV) as published by the American Conference of Governmental Industrial Hygienists. ADEM can require that pollutant emissions from newly constructed, reconstructed or modified emission sources be analyzed to compare impacts to the fractional TLV's.

The CAA also requires EPA to adopt National Emission Standards for Hazardous Air Pollutants (NESHAPs) that may adversely affect public health. There are 189 HAPs that are subject to the regulations. (The list of HAPs can be added to or deleted from.) ADEM has adopted NESHAP regulations in AAC 335-3-11.

### **3.1.2 Regulatory Applicability**

The demolition of buildings at RSA has the potential to generate emissions of criteria pollutants and hazardous air pollutants (HAP). The buildings will be demolished by using combustion techniques. Combustion of fuels and refuse produces emissions of CO, NO<sub>x</sub>, PM, SO<sub>2</sub>, VOC and HAPs. A number of buildings to be demolished are contaminated with solid propellants, such as hydroxyterminated polybutadiene (HTPB), and PBAN (a modified form of HTPB). The potential pollutant emissions from the combustion of these solid propellants are CO, PM, NO<sub>x</sub> and hydrochloric acid (HCl). The buildings are also contaminated with lead paint, asbestos and miscellaneous chemicals or solvents, which creates the potential for lead, asbestos and other HAPs to be released during demolition.

Per Subpart M, RACM is defined as (a) friable asbestos material, (b) Category I nonfriable ACM that has become friable, (c) Category I nonfriable ACM that will be or has been subjected to sanding, grinding, cutting, or abrading, or (d) Category II nonfriable ACM that has a high probability of becoming or has become crumbled, pulverized, or reduced to powder by the forces expected to act on the material in the course of demolition or renovation operations. The type of RACM material present at any structure can be determined by the test method specified in 40 CFR Part 763, Subpart E, Appendix E, Section 1, *Polarized Light Microscopy*.

The standards for demolition and renovation of buildings containing asbestos is located in Section 61.145 of Subpart M. To determine specific requirements of the standard which apply to a facility and prior to the commencement of demolition, the demolition area must be inspected for the presence of asbestos, including Category I and Category II nonfriable ACM. For demolition operations, the standards are applicable if the combined amount of RACM to be removed is: 1) at least 80 m (260 ft) on pipes or at least 15m<sup>2</sup> (160 ft<sup>2</sup>) on other facility components, or 2) at least 1 m<sup>3</sup> (35 ft<sup>3</sup>) off facility components where the length or area could not be measured previously.

The 1996 Phase I Environmental Baseline Study performed on the Thiokol buildings reported that most buildings contained asbestos. No sampling was done, in accordance with the test method specified in Appendix E, Subpart E of 40 CFR Part 763 Section 1, *Polarized Light Microscopy*, to determine the exact amount or type of asbestos-containing material. The report

also indicates that not all buildings are contaminated with propellant. Therefore, roof removal operations of RACM must be performed in accordance with the asbestos NESHAP Section 61.145[c] and per ADEM guidance. A total list of buildings to be demolished and contaminants in each is given in Table 3-1.

**Table 3-1**  
**Buildings to be Demolished**  
**Redstone Arsenal, Huntsville, AL**

Building	Building Name	Sq Feet	ACM	Propellant Contamination
<b>North Plant Thiokol Buildings</b>				
7340A	Vacuum Pump Building	124	Y	N
7361	Vacuum Pump Shelter	120	N	N
7362	Storage	600	Y	N
7363A	Mixer Control Bunker	280	Y	N
7602	Propellant Aging Lab.	892	Y	Y
7605	Calibrations Lab	1,344	Y	N
7606	Change House	5,780	Y	N
7614	Plating Shop	573	Y	N
7615	Vacuum Pump Shelter	121	Y	N
7616	Carpenter and Maintenance Shops	7,883	Y	ND
7617	Curing Oven	957	Y	ND
7618	Storage	532	Y	ND
7641	Administration	10,900	Y	N
7642	Safety Office	1,433	Y	N
7647	Large Hydrostatic Test Tower	48	Y	N
7651	Cure Test	209	Y	Y
7652	Storage	1,128	Y	Y
7653	Oven	512	Y	Y
7654	Small Motor Finishing	8,787	Y	Y
7655	Line Office	864	Y	N
7656	Oven	72	N	N
7657	Material Storage	120	Y	ND
7658	Shelter	72	Y	N
7659	Material Storage	120	Y	N
7662	Mixer Building	431	Y	Y
7663	Propellant Development	13,324	Y	Y
7664	Grit Blast/Degreaser	1,050	Y	N
7665	Line Office	743	Y	N
7667	Control Lab and First Aid	6,802	Y	N
7675	Ramps-Line 1	19,000	Y	N
7677		132	Y	N
7678	Storage	132	Y	N
7679	Storage	91	Y	N
7680	Oven	132	N	Y
7681	Processing	91	Y	Y
7682	Storage	91	Y	Y
7683	Oven	132	N	Y
7684	Thermal Stability Oven	132	Y	Y
7685	Storage	448	Y	N

7721	Ferric Flouride Processing	423	N	N
7726	Production Motor Manufacturing	17,409	Y	Y
7728	Change House and Admin. Office	7,736	Y	Y
7729	Storage-Old Boiler House	1,100	Y	N
7734	Storage	132	Y	N
7735	Storage	132	N	N
7738	Oxidizer Grinding	1,306	Y	Y
7739	Oxidizer Grinding	477	Y	N
<b>South Plant Thiokol Buildings</b>				
7561		7,909		
7565	B-Range	108	Y	Y
7566		108		
7568	Crushing and Grinding Facility	3,220	Y	N
7569	Rocket Weapons Development	1,978	Y	Y
7572	Inert Propellant Storage	640	Y	Y
7574	Laboratory and Storage Facility	15,092	Y	Y
7589	Service Building for Dry Houses	149	Y	N
7590	Dry House	310	Y	Y
7591	Dry House	310	Y	Y
7596	Solventless Line Building	6,053	Y	Y
7597	Solventless Line Building	1,110	Y	Y
7598	Chemical processing Building	7,773	Y	Y
<b>Other RSA Buildings to be Demolished</b>				
3434		41,455	Y	
3435		41,488	Y	
3490		7,808	Y	
3551		423	N	
3565		1,875	ND	
3649		6,019	Y	
4373		17,931	Y	
4809T		3,139	Y	
4810		585	Y	
5655		314	Y	
5675		2,814	Y	
5676		3,371	Y	
7132		4,428	N	
7846		650	N	
7877		132	ND	
8014		7,905	Y	

ACM - asbestos-containing material\*

Y - Yes

N - No

ND - No documentation

\* No sampling has been done to determine the type of asbestos-containing material present



## 3.2 BIOLOGICAL RESOURCES

**Region of Influence** - The ROI for biological resources is the land currently occupied by the 76 buildings under consideration for demolition. The buildings are dispersed across the Arsenal but most are concentrated on the former Thiokol North and South Plant areas.

**Affected Environment** - RSA is a single tract of land encompassing approximately 38,000 acres and is diverse in both topography and flora and fauna. Elevations range from approximately 560 feet above mean sea level (MSL) in bottomlands to 1,200 feet MSL in the mountainous regions of the Arsenal. Forest lands, rights-of-way, test areas, old-fields (abandoned open areas) in various stages of plant succession, in addition to developed areas, creeks, sloughs, and ponds provide abundant diversity in wildlife and fishery habitat on the Arsenal. Approximately one-third of RSA lies within the 100-year flood plain of the Tennessee River (U.S. Army Missile Command, 1994). This habitat diversity provides for greater fish and wildlife species diversity.

This section describes the biological resources of the areas currently occupied by the buildings proposed for demolition by major biotic habitat. Information in this section comes from existing documentation and has not been completely field verified. Even though no exhaustive inventory of the flora and fauna of RSA has been done, the Alabama Natural Heritage Program (ALNHP) conducted a biological inventory of the Arsenal to determine the presence or potential presence of Federally listed or rare species of plants and animals (Alabama Natural Heritage Program 1995). A summary table of ecological resources is also available in Appendix F of the *Final Environmental Assessment for Redstone Arsenal Master Plan Implementation* (U.S. Army Missile Command, 1994). The *Natural Resources Management Plan for Redstone Arsenal* (U.S. Army Missile Command, 1995) and the *Environmental Assessment of the Natural Resources Management Plan for Redstone Arsenal* (U.S. Army Missile Command, 1997a) are used as tiering documents for many of the resources described below.

**Vegetation** - A variety of native vegetation communities exists on the Arsenal. A comprehensive listing of native vegetation within RSA boundaries is found in Appendix B of the *Natural Resources Management Plan for Redstone Arsenal*. Specific discussion of the vegetation resources for the ROI for this document is included below.

**Fish and Wildlife** - Some of the most common mammals on RSA and WNWR (approximately 4,000 acres of which are located on the Arsenal) are white-tailed deer, beaver, eastern cottontail rabbit, swamp rabbit, gray squirrel, fox squirrel, striped skunk, red bat, woodchuck, muskrat, opossum, raccoon, red and gray foxes, and coyote (Weber, 1996). A comprehensive listing of mammals occurring on or in the vicinity of the Arsenal is presented in Appendix F of the *Final Environmental Assessment for Redstone Arsenal Master Plan Implementation*.

Over 250 bird species are residents or migrants on RSA. As many as 100 species may be encountered year round. A comprehensive listing of birds occurring on or in the vicinity of RSA including WNWR is presented in Appendix F of the *Final Environmental Assessment for Redstone Arsenal Master Plan Implementation*.

There are well over one hundred species of fish found in Arsenal waters. Roughly half of these are considered to be abundant or common. (U.S. Army Missile Command, 1995) A comprehensive listing of fish species collected at RSA and WNWR is presented in Appendix F of the *Final Environmental Assessment for Redstone Arsenal Master Plan Implementation*.

Reptile and amphibian species are well represented on RSA and WNWR lands. Fifty-one species of reptiles and twenty-nine species of amphibians are known to be present in the vicinity. A comprehensive listing of these species is presented in Appendix F of the *Final Environmental Assessment for Redstone Arsenal Master Plan Implementation*.

There is the potential for any of the terrestrial wildlife species listed in the above referenced documents to occur either temporarily or permanently in the vicinity of the buildings slated for demolition. Fish and other aquatic species would not occur on any of the areas considered as suitable habitat is lacking.

**Aquatic Habitats** - RSA is located on the north bank of the Tennessee River about 46 miles above Wheeler Dam and 17 miles downstream from Guntersville Dam. Over 10,000 acres of the Arsenal are affected by high stages of the Tennessee River and other tributary streams. (U. S. Army Missile Command, 1994) Huntsville Spring Branch, with a drainage area of 86 square miles, originates in springs and creeks of nearby mountain slopes, and flows southward through the urban areas of the city of Huntsville. In addition, HSB receives run-off from wooded mountain sides, open pasture or strip-crops within the watershed surrounding Huntsville. The branch then enters a swampy area in the northeast corner of the Arsenal at Mile 10 and flows southwestward to join Indian Creek, a tributary of the Tennessee River. Indian Creek, which enters the western edge of the Arsenal, drains an area of 143 square miles. It joins the Tennessee River at Mile 321. Indian Creek extends upstream through gently rolling topography with relatively little built-up area containing pasture land, strip-cropping, and wooded areas. The normal pool of Wheeler Lake, at elevation 556, backs into the reservation to form permanent pools of 680 and 575 acres, at the lower end of these streams. Within the installation boundaries, Indian Creek drains approximately 12,000 acres and HSB drains approximately 11,000 acres. The southern portion of the reservation drains into the Tennessee River through smaller channels and approximately 2,000 acres, located south of Madkin Mountain, drains into outlets constructed in conjunction with Fowler Road.

No significant aquatic resources are located in the vicinity of the buildings considered for demolition in this document.

**Threatened and Endangered Species** - Biological resources warranting special protection include threatened and endangered species. Under the Endangered Species Act, Federal agencies are prohibited from jeopardizing threatened or endangered species or adversely modifying habitats essential to their survival. Alabama ranks fifth in the nation (after California, Texas, Hawaii, and Florida) in the number of Federally listed endangered and threatened plants and animals. Since much of the Arsenal has not been developed, the potential is high for finding rare species of plants and animals.

No known threatened or endangered floral or faunal species are currently known from any of the areas currently occupied by the buildings considered for demolition.

**Wetlands** - For an area to be classified as a Clean Water Act (Section 404 [b]) jurisdictional wetland, evidence of three parameters are required (U. S. Army Corps of Engineers, 1987). These parameters are the presence of hydrophytic vegetation, hydric soils, and wetland hydrology. Hydrophytic vegetation can be described as plant life growing in water or in a substrate that is, at least periodically, deficient in oxygen as a result of excessive water content. Hydric soils are soils that have been saturated, flooded, or ponded long enough during the growing season to develop anaerobic conditions in their uppermost layer. Wetland hydrology

requires that the potential wetland area be inundated or have a water table within inches of the ground surface for a specified period.

Wetlands on RSA are home to a large number and variety of plant and animal species. About 26 percent of the installation is covered by wetlands. The wetlands are mostly associated with creeks or spring runs that are easily effected by the elevation of the Tennessee River (Weber, 1996) and have bottomland hardwood forests associated with the Tennessee River and its major tributaries.

Detailed jurisdictional wetland maps for the installation were not available for this analysis. National Wetlands Inventory (NWI) maps for wetland types in Madison County, prepared by the U.S. Fish and Wildlife Service were used instead. These non-jurisdictional maps were constructed from photo interpretations of aerial photography and were verified by spot ground-truthing. Recent work reports the total wetland acreage of the Arsenal to be 9,889.5 acres (Geonex, 1995).

No wetland areas are known to exist in or immediately around any the buildings under consideration for demolition.

**Unique Habitats** - Biological resources warranting special protection include species that occupy unique habitats. There are numerous locations throughout RSA that fall under these categories (Alabama Natural Heritage Program, 1995) including several aquatic and terrestrial cave communities and springs. There are no unique habitats known to be near any of the buildings considered for demolition.

### **3.3 CULTURAL RESOURCES**

**Region of Influence** - The ROI is the area currently occupied by the 76 buildings under consideration for demolition.

**Affected Environment** - Cultural resources consist of prehistoric and historic districts, sites, structures, artifacts, and any other physical evidence of human activity considered important to a culture or community for scientific, traditional, religious, or other reasons. Cultural resources are divided into three categories: archaeological (prehistoric and historic), historic resources and structures, and traditional (e.g., American Indians or other ethnic groups).

Prehistoric archaeological resources are defined as physical remnants of human activity that predate the advent of written records in a particular culture and geographic region. They include archaeological sites, structures, artifacts, and other evidence of prehistoric behavior.

Historic resources consist of physical properties or locations postdating the advent of written records in a particular culture and geographic region. They include archaeological sites, structures, artifacts, documents, and other evidence of human behavior. Historic resources also include locations associated with events that have made a significant contribution to history or that are associated with the lives of historically significant persons.

Traditional native resources may be prehistoric sites and artifacts, historic areas of occupation and events, historic and contemporary sacred areas, materials used to produce implements and sacred objects, hunting and gathering areas, and other botanical, biological, and geological resources of importance to contemporary American Indian groups.

The Arsenal is divided into three topographic or land form zones that possess varying degrees of archaeological potential. Zone 1 is composed of rolling land combined with flat plateaus that have undergone considerable erosion and is considered to have low to moderate archaeological potential. Zone 2 is made up of the flood plains on the Arsenal and is considered to have high archaeological potential. Zone 3 is composed of mountainous land and is considered to have low archaeological potential. (U.S. Army Missile Command, 1994)

Cultural and archaeological resources are limited, nonrenewable resources whose potential for scientific research or value as a traditional resource may be easily diminished by actions which significantly impact the integrity of the property. Activities that disturb the ground in which an archaeological site is present can destroy temporally and culturally diagnostic artifacts and features or alter artifact provenance. Significance of impacts is determined by the intensity and context of the alteration of the distinctive characteristics and integrity of a property.

The prehistory of RSA spans the time range from circa 12,000 B. C. until European contact (approximately 1800), and there are now nearly 250 known archaeological sites recorded on RSA. Redstone Arsenal has yielded a number of particularly significant Paleo-Indian period sites (from 8,000 to 12,000 B. C.). The Redstone Point, an identified Clovis point linked to the Paleo-Indians, is named for an example found on RSA. American Indian occupation of the RSA area is believed to have been nearly continuous through the late Mississippian Period (A. D. 899-1500), at which time native Indian populations declined in the area. Although the historic Chickasaw Indians established a village on Hobbs Island (in nearby Huntsville) by at least the late 1760s, inter-tribal rivalries between the Chickasaws and Cherokees essentially turned the RSA area into a "no man's land." The 1786 Treaty of Hopewell placed the boundary line between the Chickasaws and Cherokee directly through the middle of Madison County. This area was opened up for American settlement in the early 1800s, and the City of Huntsville was incorporated in 1811. Both the Chickasaws and Cherokee tribes were completely removed from northeastern Alabama by 1832.

From the establishment of Madison County in the early 1800s until the beginning of World War II in 1941, the RSA area was occupied by a number of small subsistence farms. A number of small agrarian, rural communities were located in this portion of Madison County. Two historic homes dating to this time period, the Sam Harris House (Building 8012) and Goddard Home (Building 7134), and a number of family or community historic cemeteries remain on RSA. The Harris House is listed on the Alabama State Register of Historic Places. (U.S. Army Space and Strategic Defense Command, 1995) The rich soils of the area, the railroad transportation routes of the Memphis and Charleston Railroad (running east-west) and the Nashville and Decatur Railroad (running north), and the river transportation offered by the Tennessee River combined to make Madison County a productive and wealthy agricultural area. The Memphis and Charleston Railroad continues to operate on the antebellum route, today owned and operated by the Norfolk Southern Railroad.

During the mid Nineteenth Century, the "Southern Rights" movement arose in the states of the deep south, advocating secession of the southern states from the Union. With the election of Republican Abraham Lincoln as President in 1860, secession became a reality. North Alabama was not a stronghold for secession, and all nine counties sent Cooperationist rather than Secessionist delegates to the Alabama Secession Convention (Dorman, 1995). Because of the strategic importance of the Memphis and Charleston Railroad, Union forces occupied the area as early as April, 1862. By the spring of 1864, North Alabama was a Federal transportation and supply depot supporting Major General William T. Sherman's Atlanta Campaign. To protect this important rail line, garrisons were established on the Tennessee River at crossing sites and on the

Memphis and Charleston Railroad. River garrisons were established at Whitesburg (Ditto Landing) Triana, and Mooresville near RSA. Railroad garrisons were established at Huntsville, Madison Station and at Indian Creek on the Memphis and Charleston in the vicinity of RSA. Federal and Confederate units occasionally traversed the RSA area, and camped on lands now belonging to the arsenal.

Following President Lincoln's Emancipation Proclamation, which went into effect on January 1, 1863, the southern slave based economy was eradicated. With the end of the war, the North Alabama economy was in turmoil. By the 1870s the plantation agricultural system had been replaced by a tenant farming system. A 1908 recruitment booklet for Huntsville stated of the city's cotton mills:

“We have nine cotton mills, with an aggregate capital of over four and one-half million dollars, employing four thousand operatives, which calls for a pay roll of about eighty thousand dollars monthly and consume sixty thousand bales of cotton per year. They spend in the course of twelve months a little short of a million dollars for labor and nearly \$3,000,000 for cotton. The products of these mills are shipped to all parts of the world, and one of the mills make direct shipment to China and Japan. The employees are well housed, are furnished with free parks, in which they enjoy band music two nights in the week during the summer months, and some of the mills maintain free schools. There is plenty of room for more cotton mills, and for other factories which would align themselves with them. (Business Men's League of Huntsville, Alabama, 1908)

With the outbreak of World War II in 1939, American military and political leadership determined to take efforts to begin preparing the United States for effective national defense. These efforts, collectively known as the Protective Mobilization, were broad based efforts to modernize the small American armed forces and military industry, and prepare for involvement in the European and Asian conflict. One area of military manufacturing assessed was chemicals weapons. The United States had only a single chemical manufacturing installation, Edgewood Arsenal, Maryland. Edgewood would undergo expansion in 1941, but would still not be large enough to support the nation's anticipated chemical manufacturing needs. Accordingly, three Chemical Warfare Service (CWS) facilities were planned at Huntsville, Pine Bluff in Arkansas, and Rocky Mountain in Colorado. All of these were to be responsible for the production of a wide range of toxic chemicals, incendiaries, smoke munitions and protective clothing. (U.S. Army Missile Command, 1997b. Hereinafter cited as Panamerican Consulting, *WW II Architectural Assessment of Redstone Arsenal*)

In 1941 the U. S. government condemned 37,000 acres of land southwest of Huntsville, and construction began on the Huntsville CWS facility on August 4, 1941. Construction was performed by a Baltimore based engineering firm, Whitman, Requardt and Smith (WRS). By 1942 there would be three actual facilities at Huntsville. Huntsville Arsenal provided the logistical, administrative, housing, and maintenance services for the base, in addition to manufacturing areas. Redstone Ordnance Plant, operated by the Ordnance Department, fabricated munitions. The Gulf Chemical Warfare Depot, operated by the CWS, was responsible for the manufacture of a number of chemicals, including mustard gas (H, a toxic agent), Lewisite (L, a toxic agent), Chlorine (a toxic agent), white phosphorous (WP, an obscuration and marking agent), phosgene (CG, a toxic agent), tear gas/Adamsite (CN-DM, an incapacitating agent), and Thionyl Chloride (TC). By the end of the war, Huntsville had become the sole manufacturer of colored smoke munitions, was noted for its production of gel-type incendiaries (such as napalm and jellied gasoline), and had produced more than 27 million items of chemical munitions with a total value of more than \$134.5 million. (U.S. Army Missile Command, 1997b)

Huntsville Arsenal consisted of three manufacturing plants, an administrative area, and Redstone Army Airfield. Plants 1 and 2, duplicates of each other, manufactured a wide range of chemicals. Plant 3 produced incendiary materials. Plants 1 and 2 were sufficiently dispersed that a single air raid would not be able to cripple both plants simultaneously. Chemicals manufactured at Huntsville Arsenal were transported to Redstone Ordnance Plant. Here ordnance items were actually manufactured. Redstone Ordnance Plant had two burster loading assembly lines and three chemical munitions assembly lines. Bursters refer to the explosive elements that detonate and disperse the chemical weapon. A fourth chemical munitions assembly line was completed at the end of World War II and never used. Redstone Ordnance Plant's six lines are divided into "North Plant" and "South Plant" areas. "North Plant" consists of lines 1, 2 and 5 and "South Plant" consists of lines 3 and 4. Had line 6 gone into operation, it would have been located in the "South Plant" area. Redstone Ordnance Plant also had a significant administrative area. Gulf Chemical Warfare Depot was responsible for the handling of chemical ammunition and toxics for zone distribution, shipment to ports of embarkation, and reserve storage. Gulf Chemical Warfare Depot was located in the extreme southwestern end of Huntsville Arsenal. The depot primarily consisted of warehouse, igloo (bunker), toxic yard and open storage areas. Most Gulf Chemical Warfare Depot administrative and support activities were provided by Huntsville Arsenal. (U.S. Army Missile Command, 1997b)

Following World War II, RSA was temporarily inactivated. In fact, several manufacturing lines were never placed into production. Portions of the base were closed, and a number of buildings were sold. Several private industries leased or purchased a number of the World War II facilities.

This brief period of inactivity came to an end in 1950, when RSA's large area, excellent transportation infrastructure and proven chemical production facilities resulted in the arsenal's re-activation as the nation's rocket and missile research center. In 1951, RSA was assigned the national responsibility for rocket and missile research, development, and testing. At the heart of these activities was a group of 120 German scientists, led by Dr. Wernher Von Braun, that had developed and launched the V-2 rocket during World War II. Although this effort was initially oriented to the research and development of military ballistic rockets and missiles, the Russian launch of Sputnik combined with the failure of American developed hardware resulted in Van Braun's team being asked to launch an American satellite. Within three months, Von Braun and his scientists successfully launched the Explorer I satellite.

The Cold War (1946-1989) is a term which describes the tense, strained relations which existed between the United States and the Union of Soviet Socialist Republics (USSR). This period occurred between the end of World War II and the collapse of the USSR. This period saw a rebirth of what is now RSA and included the consolidation of RSA, Huntsville Arsenal and the Gulf Chemical Warfare Depot. The union of installations brought a change in mission, as the Army consolidated its missile/rocket research and manufacturing assets. Because of RSA's successful involvement in numerous rocket and missile programs during the Cold War era, related U. S. Army commands were subsequently established at the Arsenal. These include the U. S. Army Aviation and Missile Command (AMCOM), Ordnance and Missile Munitions Center and School (OMMCS) and Redstone Technical Test Center (RTTC). Late in 1959, Von Braun and most members of his team were transferred from the U. S. Army to a new government organization responsible for space exploration, the National Aeronautical and Space Administration (NASA). NASA established Marshall Space Flight Center (MSFC) on RSA. NASA, AMCOM, OMMCS and RTTC continue their missions at RSA today. Although a tenant organization of RSA, NASA is responsible for NEPA and NHPA compliance for the structures and facilities on MSFC.

As a result of RSA's intense involvement in the space industry, National Register of Historic Places (NRHP) recognition has been granted to a number of facilities at MSFC and administrated by NASA (Washington, D. C.: National Trust of Historic Places, 1994):

- Neutral Buoyancy Space Simulator, MSFC (National Historic Landmark)
- Propulsion and Structural Test Facility, MSFC (National Historic Landmark)
- Redstone Test Stand, MSFC (National Historic Landmark)
- Saturn V Dynamic Test Stand, MSFC (National Historic Landmark).

### **3.4 HAZARDOUS MATERIALS AND WASTE**

**Region of Influence** - The ROI are the 76 buildings under consideration for demolition and the immediately surrounding land.

**Hazardous Materials** - Regulatory agencies have defined hazardous material as applied to specific situations. The broadest and most applicable definition is specified by the Department of Transportation (DOT) for regulation of transportation of hazardous materials. DOT defines a hazardous material as a substance or material which is capable of posing an unreasonable risk to health, safety, or property when transported in commerce and has been so designated (49 CFR 171.8).

Several Federal agencies oversee hazardous material usage. DOT regulates packaging and transporting of hazardous materials in 49 CFR parts 171 through 180 and Part 397. OSHA regulates the use of hazardous materials in the workplace in 29 CFR, primarily Part 1910. Environmental safety and public health issues associated with hazardous materials are regulated by EPA through specific criteria applied to areas such as air emissions and water discharge.

#### *Lead-Based Paint*

Lead was used in many paints applied before the early 1980's. It was also used in piping, cable sheaths, batteries and solder. Lead is regulated in the workplace for exposure to workers although most documented health effects relate to pregnant women and children where exposure has been correlated with birth defects and learning difficulties. There has been a large scale lead abatement program within public buildings over the last few years in the U.S. as a result of these risks. The requirements for workers to follow dust control techniques and respiratory protection normally only become effective when paint containing lead is abraded or the structure is demolished. (The Environmental News, 1995) At least five of the buildings to be demolished contain lead-based paint. There are several buildings which are suspected to contain lead-based paint since they were constructed in the 40's and 50's. For a complete listing of the buildings containing lead-based paint in the former Thiokol North and South Plants and other areas of RSA, see Tables 3-2, 3-3, and 3-4 respectively.

#### *Asbestos-Containing Materials*

Historically, asbestos has been used in literally hundred of products. Collectively, these products are frequently referred to as asbestos-containing materials (ACM). Asbestos gained widespread use because it is plentiful, readily available, low in cost, and has unique properties. It does not burn, is strong, conducts heat and electricity poorly, and is impervious to chemical corrosion. Asbestos surveys have been randomly conducted throughout the Arsenal on various occasions. Of the 47 buildings in the former Thiokol North plant area, ACMs have been identified in 37 buildings. Refer to Table 3-2 for a complete listing of building numbers. Nine of the thirteen

buildings located in the old South Plant area have been confirmed to contain asbestos, refer to Table 3-3 for further details. Of the remaining 16 buildings located throughout the Arsenal, 11 are known to contain asbestos, see Table 3-4 for a complete listing. It has been determined, that 11 buildings do not contain any ACMs, they are: 7361, 7680, 7683, 7721, 7729, 7734, 7735, 7738, 7739, and 7132.

*MOCA - 4,4'-Methylene bis (2-chloroaniline)*

MOCA (CAS # 101-14-4) is yellow-tan pelletized chemical with a slight amine odor. MOCA will decompose at approximately 400°F and has a flash point of 480°F so fire and explosion hazard data should be closely monitored in buildings proposed for demolition with documented contamination of this material. Should thermal breakdown occur, excessive pressure could be generated and an explosion hazard could be possible. This chemical is also a suspected carcinogen. A MSDS for this product is located in Appendix C. There are two buildings within the North Plant area that are known to be contaminated with MOCA. These buildings include 7653 and 7728.



**TABLE 3-2. BUILDINGS LOCATED AT NORTH PLANT**

Building #	Square Footage	Year Constructed	Priority I or II	Contains Asbestos	Contains Lead Based Paint
7340A	124	1960	priority I	yes	no
7361	120	1961	priority I	no	no
7362	600	1961	priority I	yes	no
A-7363	280	1959	priority I	yes	no
7602	892	1942	priority II	yes	no
7605	1344	1942	priority II	yes	no
7606	5780	1943	priority II	yes	no
7614	573	1940's	priority II	yes	no
7615	121	1940's	priority II	yes	no
7616	7883	1940's	priority II	yes	no
7617	957	1940's	priority II	yes	no
7618	532	1940's	priority II	yes	no
7641	10900	1940's	priority II	yes	no
S-7642	1433	1940's	priority II	yes	no
7647	48	1967	priority I	yes	no
7651	209	1941	priority II	yes	no
7652	1128	1941	priority II	yes	no
7653	512	1941	priority II	yes	no
7654	8787	1942	priority II	yes	no
7655	864	1940's	priority II	yes	no
7656	72	1940's	priority II	yes	no
7657	120	1941	priority II	yes	no
7658	72	1940's	priority II	yes	no
7659	120	1941	priority II	yes	no
7662	431	1941	priority II	yes	no
7663	13324	1941	priority II	yes	no
7664	1050	1940's	priority II	yes	no
7665	743	1940's	priority II	yes	no
7667	6802	1941	priority II	yes	no
7675	19000	1942	priority II	yes	no
7677	132	1942	priority II	unknown	unknown
7678	132	1940's	priority II	yes	no
7679	91	1959	priority I	yes	no
7680	132	1942	priority II	no	no
7681	91	1940's	priority II	yes	no
7682	91	1940's	priority II	yes	no
7683	132	1942	priority II	no	no
7684	132	1940's	priority II	yes	no
7685	448	1943	priority II	yes	no
7721	423	1942	priority II	no	yes
7726	17409	1942	priority II	yes	yes
7728	7736	1941	priority II	yes	yes
7729	1100	1941	priority II	no	no
7734	132	1942	priority II	no	no
7735	132	1942	priority II	no	no
7738	1306	1945	priority II	no	yes
7739	477	1945	priority II	no	yes

**TABLE 3-3. BUILDINGS LOCATED AT SOUTH PLANT**

Building #	Square Footage	Year Constructed	Priority I or II	Contains Asbestos	Contains Lead Based Paint
7561	7909	1942	priority II	suspected	suspected
7565	108	1945	priority II	suspected	suspected
7566	108	1962	priority I	not available	not available
7568	3220	1954	priority I	suspected	no
7569	1978	1945	priority II	yes	suspected
7572	640	1942	priority II	yes	suspected
7574	15092	1942	priority II	yes	suspected
7589	149	1951	priority I	yes	suspected
7590	310	1951	priority I	yes	suspected
7591	310	1951	priority I	yes	suspected
7596	6053	1955	priority II	yes	suspected
7597	1110	1955	priority II	yes	suspected
7598	7773	1955	priority II	yes	suspected

**TABLE 3-4. BUILDINGS LOCATED ELSEWHERE ON REDSTONE ARSNEAL**

Building #	Square Footage	Year Constructed	Priority I or II	Contains Asbestos	Contains Lead Based Paint
3434	41455	1960	priority I	yes	suspected
3435	41488	1960	priority I	yes	suspected
3490	7808	1942	priority II	yes	suspected
3551	423	1942	priority I	no	suspected
3565	1875	1942	priority II	unknown	suspected
3649	6019	1942	priority II	yes	suspected
4373	17931	1977	priority I	yes	suspected
T-4809	3139	1942	priority I	yes	suspected
4810	585	1960	priority I	yes	suspected
5655	314	1943	priority II	yes	suspected
5675	2814	1943	priority II	yes	suspected
5676	3371	1943	priority II	yes	suspected
7132	4428	1945	priority I	no	no
7846	650	1968	priority I	no	suspected
7877	132	1942	priority I	unknown	suspected
8014	7905	1942	priority II	yes	suspected

**Hazardous Waste** - Waste materials (less commonly referred to as solid waste) are defined in 40 CFR 261.2 as “any discarded material (i.e., abandoned, recycled, or ‘inherently waste-like’)” that is not specifically excluded. This can include both solid and containerized liquid materials. Hazardous waste is further defined in 40 CFR 261.3 as any solid waste not specifically excluded which meets specific concentrations or has certain toxicity, ignitability, corrosivity, or reactivity characteristics. Hazardous waste oversight is provided primarily by the EPA (as mandated by RCRA, CERCLA, and SARA). EPA regulations are found in 40 CFR. DOT regulates hazardous waste transportation. DOT requirements are found in 49 CFR.

### 3.5 HEALTH AND SAFETY

**Region of Influence** - The ROI are the 76 buildings under consideration for demolition and the immediately surrounding land.

**Affected Environment** - Health and safety includes consideration of any activities, occurrences, or operations that have the potential to affect one or more of the following.

- The well-being, safety, or health of workers - Workers are considered persons directly involved with the operation or who are physically present at the operational site.
- The well-being, safety, or health of members of the public - Members of the public are considered persons not physically present at the location of the operation, including workers at nearby locations who are not involved in the operation and the off-installation population.

OSHA is responsible for protecting worker health and safety in non-military workplaces. OSHA regulations are found in 29 CFR. Protection of public health and safety is an EPA responsibility and mandated through a variety of laws such as RCRA, CERCLA/SARA, CWA and the CAA. EPA regulations are found in 40 CFR. Additional safety responsibilities are placed on the DOT in 49 CFR. Department of the Army program requirements are outlined in AR 385-100.

### 3.6 INFRASTRUCTURE AND TRANSPORTATION

Infrastructure addresses those facilities and systems that provide power, water, wastewater treatment, the collection and disposal of solid waste, fire, health, and police services to RSA.

Transportation addresses the modes of transportation (air, road, rail, and marine) that provide circulation within and access to the installation. The transportation baseline sections that follow the infrastructure sections describe the existing conditions and, where appropriate, the capacities of the various transportation modes in and around RSA.

**Region of Influence** - The ROI for infrastructure and transportation is RSA.

**Power** - Electrical service is provided by the Tennessee Valley Authority (TVA) through a number of local distribution companies. Substantial excess capacity is available within the Tennessee Valley to provide electrical service to meet all current and foreseeable requirements. Electricity, and water are provided by the City of Huntsville by, Huntsville Utilities. Natural gas is provided by North Alabama Gas, through Huntsville Utilities, and is the primary fuel for boilers and heating plants. The primary source of steam for the Arsenal is the Waste-to-Energy plant owned and operated by the Huntsville Solid Waste Disposal Authority.

**Water** - RSA derives the majority of its water supply from the Tennessee River. Potable water is supplied from two treatment plants on the Arsenal. The primary industrial water source is Water Treatment Plant #1. In case of an emergency, RSA can obtain 1.0 MGD of potable water from the City of Huntsville. Nonpotable wells are located in two areas of the Arsenal: the Visitors Control Building (Building 5105) and Test Area 3. The potable water distribution network consists of two separate systems: An upper level system which supplies water to the areas of higher elevations on the northern portions of the Arsenal and a lower level system which supplies water to the remainder of the Arsenal. Potable water is stored using 5 elevated steel tanks, 5 steel standpipes, and one concrete standpipe. This equipment is capable of storing a combined total of 2.585 million gallons. Arsenal storm water drainage is conveyed to the Tennessee River via

McDonald Creek, Huntsville Spring Branch, and Indian Creek. The southern portion of the Arsenal drains directly into the Tennessee River. (U.S. Army Missile Command, 1994)

**Solid Waste** - RSA operates a 73-acre landfill, permitted by the state of Alabama, for the disposal of inert material consisting of rocks, concrete construction materials, asphalt, and construction debris including tree stumps and asbestos. The landfill has a one mile unpaved perimeter road. The landfill stopped accepting municipal waste (garbage) in 1992, when the Huntsville Solid Waste Disposal Authority's incinerator started operating. The equipment used to manage the landfill include one dust control water truck, two bulldozers, a compactor, and a front end loader. Trash and garbage generated on the Arsenal is hauled off-post for disposal. The majority of the waste is taken to the Huntsville Solid Waste Authority Waste-to-Energy Plant adjacent to the Arsenal.

**Roads** - RSA has a well-developed roadway network for easy ingress and egress in three directions (the Tennessee River forms the southern border of the Arsenal preventing roadway access in that direction). The primary links in the network carry traffic to and from the Arsenal and serve as arterials for traffic movement through the area. Major north-south roads are Rideout, Patton and Toftoy. Major east-west roads are Goss, Martin, and Redstone. All of the major roads have paved, all-weather surfaces and are in good condition.

**Rail** - Use of rail facilities was largely discontinued on RSA in 1973. Most of the tracks have been removed, and only two small sections of rail remain on the Arsenal. One portion of track, less than a mile in length, is located near Patton and Redstone Roads. The second section of rail is the Southern Railway Classification Yard located in the northwestern portion of the Arsenal, west of Rideout Road.

**Air** - The Redstone Arsenal Airfield, controlled by AMCOM, provides research and development aircraft support to AMCOM and administrative aviation support to AMCOM, RSA, various tenant activities, Space and Strategic Defense Command, and Readiness Group Redstone. Redstone Army Airfield has a north-south, 7,300-foot-long and 150-foot-wide hard surface runway with concrete approaches. The runway can accommodate any aircraft in the U.S. Army's inventory used for transportation and personnel. The airfield is used by both military and civilian aircraft, although civilian aircraft require special advanced permission to use the field.

### **3.7 LAND USE**

**Region of Influence** - The ROI is RSA and the immediate surrounding area.

**Affected Environment** - RSA prepared a Land Use Plan as part of the 1989-1994 Installation Master Plan. The Land Use Plan promotes cost effective and efficient use of available land, assists in planning for future growth and development, and promotes compatible and coordinated land use. The land on the Arsenal is divided into seven major use areas: Ammunition Supply; Test and Operations; Research and Development; Training; Troop Housing; Community Recreation; and Family Housing. Within these areas are facilities for recreation, administration, training, operational maintenance, production tests, storage, and post maintenance. The NASA Marshall Space Flight Center is also located within the Arsenal's boundaries. Approximately 30 percent (11,400 acres) of RSA is considered buildable. There are approximately 2,800 acres remaining that are considered available for development (U.S. Army Missile Command, 1994).

The 1988 RSA forest inventory shows approximately 42 percent (16,180 acres) of the Arsenal covered in forest. Approximately one-third of the Arsenal lies within the 100-year flood plain of the Tennessee River (U.S. Army Missile Command, 1994).

The buildings under consideration for demolition are dispersed throughout the Arsenal and are no longer used. The majority of the buildings proposed for demolition are located in the former Thiokol North and South Plant areas.

### **3.8 NOISE**

**Region of Influence** - The ROI are the 76 buildings under consideration for demolition and the immediately surrounding land.

**Affected Environment** - Noise is usually defined as sound that is undesirable because it interferes with speech and hearing, can damage hearing, or is otherwise annoying. Sound pressure magnitude is measured in decibels (dB). The basic instrument for sound measurement is a sound-level meter for measuring dBA where “A” denotes that the meter is fitted with a frequency-weighting circuit that roughly matches the sensitivity of the human ear. RSA has an Installation Compatible Use Zone Program to identify noise generating areas on the Arsenal and to minimize encroachment of noise sensitive activities both on and off the Arsenal. It is not intended to inhibit operations but to inform community officials of the expected noise generation from mission-related activities. RSA is divided into three noise zones. Residential housing, schools, churches, and other noise sensitive land uses are located in Zone I. These land uses are considered to be marginally acceptable in Zone II, and unacceptable in Zone III. Buildings 4809 and 4810 located adjacent to the Redstone Army Airfield are located in Zone III. The remainder of the buildings proposed for demolition are located in Zone I. Army facility planners work with the community governments and planning agencies to promote adequate buffer zones between the installation’s noise sources and the noise-sensitive areas. (U.S. Army Missile Command, 1994)

The principal sources of noise on the Arsenal are rocket motor flight test and static firings, warhead detonations/impacts, gun firings, demolition, and airfield operations. Noise producing activities are located such that a significant buffer zone exists between noise producing activities and the nearest population centers. The largest population densities adjacent to the Arsenal are in Huntsville on the north and east boundaries. (U.S. Army Missile Command, 1994)

### **3.9 GEOLOGY AND SOILS**

**Region of Influence** - The ROI for geology and soils are the areas currently occupied by the 76 buildings proposed for demolition.

**Affected Environment** - According to the U.S. Department of Agriculture (USDA) Soil Conservation Service (SCS) Soil Survey of Madison County, a total of 94 soil phases representing 39 different soil series are mapped within the RSA boundaries. The predominant soil type mapped for the Arsenal consists of a deep, well-drained to moderately well-drained, silt loam to silty clay loam. These soils typically possess a loamy surface horizon underlain by a loamy to clayey subsoil layer with lenses of silty and/or sandy clay. Rock fragments generally occur throughout the clayey material. The colors range from a brownish-red in the northern portion to a brownish-gray in the southern portion of the Arsenal. Soil depths range from very shallow on the mountainous slopes to much deeper along the larger tributaries along the

Tennessee River where broad areas have formed. Soils from six associations can be found within the Arsenal boundaries (Table 3-5).

The geologic formations in Madison County are sedimentary in origin and were formed either by the accumulation of fragments of previously existing rocks, by the accumulation of organic matter, or by chemical precipitation. Most of RSA is underlain by Tuscumbia Limestone. This limestone has an average thickness of 150 feet; consists of gray, medium to coarse-grained, fossiliferous limestone; and contains chert nodules. It often contains enlarged openings that have developed along joints, fractures, and faults. Caves are located on RSA in the vicinity of the Weeden and Madkin Mountains. The Tuscumbia Limestone is successively underlain by Fort Payne Chert, Chattanooga Shale, and other, older geological units. Overlying the Tuscumbia limestone, from oldest to youngest, are the Ste. Genevieve limestone, Hartselle Sandstone, and Bangor limestone, all of the Upper Mississippian age. The Ste. Genevieve limestone forms the slopes of the mountains and higher elevations above the Tuscumbia formation within the southern part of the Arsenal. The Hartselle sandstone forms the top of Bradford Mountain and forms the concentric bands around Madkin and Weeden Mountains. Tan, fine-grained, fossiliferous sandstone with some siltstone and shale make up the Hartsville formation. Bangor limestone caps the Madkin and Weeden Mountains, which is comprised of gray, crystalline, oolitic, fossiliferous limestone (see Figure 3-1). The surface geology of Madison County consists of unconsolidated sedimentary material overlying the rock formations. The unconsolidated material, called "regolith", is mainly derived from the weathering of bedrock. Regolith thickness varies from 20 to 40 feet in the northeastern part of the Arsenal to as much as 80 feet in the southern and western parts. (U.S. Army Missile Command, 1994)

No significant mineral resources are known to exist on the Arsenal. (U.S. Army Missile Command, 1994)

**Table 3-5**  
**SOIL ASSOCIATIONS FOUND ON REDSTONE ARSENAL**

<b>Soil Association</b>	<b>Description</b>
<b>Decatur-Cumberland-Abernathy</b>	Generally well-drained, red, fertile soils that are thick over limestone bedrock. Found on nearly level to gently rolling terrain.
<b>Allen-Jefferson</b>	Well-drained, generally found on undulating to rolling terrain. Usually occupy gentle valley slopes at the base of steep, stony mountains.
<b>Holston-Tupelo-Robertsville</b>	Poorly to moderately well-drained and variable in texture and permeability. Found on nearly level to undulating terrain.
<b>Hermitage-Talbott-Colbert</b>	Thin with a clayey texture and low permeability. These soils occupy the slopes adjacent to steep mountainous areas.
<b>Huntington-Lindside-Hamblen</b>	Located on nearly level, broad areas of bottom land along the larger creeks and rivers. Subject to periodic flooding.
<b>Rough Stony Land</b>	Thin soil that occupies steep mountainous slopes. Slopes are generally covered with rock debris

Source: U.S. Army Missile Command, 1994

Figure 3-1 goes here

### **3.10 SOCIOECONOMICS**



**Region of Influence** - The ROI for socioeconomics is RSA, Huntsville, Madison County and northern Alabama. Socioeconomics within this EA is concerned with population and employment for this area.

**Affected Environment** - RSA contributes significantly to the economics and demographics of Madison County and northern Alabama. Madison County population, according to 1990 Census data, is approximately 240,000. This figure includes over 160,000 that reside in Huntsville. The county labor force is over 140,000. RSA contributes over 21,000 Federal government and contractor jobs to the Madison County area, and is the single largest employer in the county. The Arsenal impacts the regional economy not only by direct employment of civilian and military personnel, but by procurement of goods and services as well. These impacts are cumulative. The salary and procurement dollars from RSA spent locally on goods and services creates a demand for additional employment and goods and services in the local and northern Alabama economies.

Mention the proposed action; size of contract to demolish (\$); number of people expected to be employed; etc.

### 3.11 WATER RESOURCES

**Region of Influence** - The ROI for water resources is RSA.

**Affected Environment** - To protect both surface water and groundwater resources, and human health, Congress enacted the Clean Water Act and the Safe Drinking Water Act. The EPA has also established water quality standards to protect water resources. Army Regulation 200-1, Chapter 3, implements the Army Water Management Program.

The Tennessee River, flowing west, forms the southern boundary of the Arsenal. Major water courses that flow through the Arsenal are Indian Creek, Huntsville Spring Branch, and McDonald Creek. Each of these tributaries flows generally south and empties into the Tennessee River (Figure 3-2). Most of the western half of RSA drains into Indian Creek, and the eastern half drains into Huntsville Spring Branch. Indian Creek originates in the northwestern portion of Madison County; flows southward across RSA; and forms an arm of Wheeler Lake. Indian Creek drains approximately 63 square miles of terrain. Approximately one-third of the Arsenal lies within the 100-year floodplain of the Tennessee River. These areas on the Arsenal include most of the Wheeler National Wildlife Refuge, several creeks and ponds, and the Tennessee River banks.

The quality of surface water varies across the drainage divide of RSA. In the western half of the drainage area including Indian Creek, the western portion of Wheeler Reservoir, and the Tennessee river, the surface water is characterized as “moderately hard” to “hard”, moderately high in dissolved solids, locally high in manganese, and suitable for most uses after chlorination and treatment outlined in the state water laws. In Huntsville Spring Branch, McDonald Creek, and the eastern half of Wheeler Reservoir which lies east of the drainage divide, water quality is characterized as “hard” to “very hard”, locally acidic, low in

Figure 3-2 goes here

dissolved oxygen, locally high in manganese, and high in biochemical oxygen demand. The Arsenal regularly samples and tests water quality at several locations on Indian Creek and Huntsville Spring Branch.

The Fort Payne Chert and Tuscumbia Limestone are the principal aquifers in the ROI. Groundwater movement is generally from north to south. The groundwater in local aquifers moves to lowland areas in the stream basin where it discharges through available openings and provides base flow to the local streams. The aquifers beneath RSA are some of the most productive in Madison County. (U.S. Army Missile Command, 1994)

The Arsenal has a facility wide National Pollutant Discharge Elimination System (NPDES) Permit.

## 4.0 ENVIRONMENTAL CONSEQUENCES

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Federal environmental laws and regulations were reviewed to determine established thresholds for assessing environmental impacts (if any) under NEPA. Proposed activities were evaluated for their potential to result in significant environmental consequences based on the interpretation of significance outlined in the CEQ regulations for implementing the procedural provisions of NEPA (40 CFR 1500-1508) and AR 200-2, *Environmental Effects of Army Actions*.

CEQ Guidelines (40 CFR 1508.27) specify that significance should be determined in relationship to both context and intensity (severity). Three levels of impact can be identified:

- No Impact - No impact is predicted.
- No Significant Impact - An impact is predicted, but the impact does not meet the intensity/context significance criteria for the specific resource.
- Significant Impact - An impact is predicted that meets the intensity/context significance criteria for the specific resource.

Sections 4.1 through 4.11 describe expected impacts to the environment from the proposed action, impacts to the environment from alternatives including the no-action alternative, cumulative impacts, and potential mitigation measures. The amount of detail presented in each section is proportional to the potential for impacts. Sections 4.12 through 4.23 summarize cumulative impacts and mitigation measures, and address other specific NEPA requirements.

### 4.1 AIR QUALITY

Because of the potential emissions of regulated pollutants from the proposed demolition operations, the impact to the general area surrounding RSA must be considered. The natural environments potentially affected by the proposed demolition include the Wheeler National Wildlife Refuge, rural woodlands, and pasture lands, plus other surrounding public areas. To meet compliance with ADEM air pollution control regulations, ADEM has issued specific work practice standards for mitigating potential asbestos emissions and resulting exposure which must be followed during demolition operations. The work practice standards are shown in Table 4-1. The qualitative effect of emissions on ambient air quality will be discussed in Chapter 4.

In addition to the work practice standards issued by ADEM, the requirements of the NESHAP for Asbestos must be followed. The NESHAP for Asbestos is published in 40 CFR 61 Subpart M. It is applicable to the removal of regulated asbestos-containing material (RACM).

If RACM is not being removed from a demolition operation, the procedures are not applicable, but, notification of demolition is always required in accordance with Section 61.145(b). The asbestos NESHAP states in Section 61.145[c](1) that RACM need not be removed before demolition if: 1) it is Category I nonfriable ACM that is not in poor condition and is not friable, 2) it is on a facility component that is encased in concrete or other hard material and is adequately wet whenever exposed during demolition, 3) it was not accessible for testing before demolition and was discovered after demolition began, or 4) it is Category II nonfriable ACM that will not become crumbled or reduced to powder during demolition. However, the NESHAP further states in Section 61.145[c](10) that 'if a facility is demolished by intentional burning, all RACM including Category I and Category II nonfriable ACM must be removed in accordance with the NESHAP before burning.' Since the buildings will be demolished by flash burning, the

<p align="center"><b>Table 4-1</b></p> <p align="center"><b>Work Practices for Demolition of Thiokol Structures</b></p> <p align="center"><b>Redstone Arsenal, Huntsville, AL</b></p>	
<b>Condition*</b>	<b>Required Actions</b>
No ACM/No Propellant	<ul style="list-style-type: none"> <li>a. Push Down</li> <li>b. Take tarped loads to landfill</li> </ul>
ACM and Propellant	<ul style="list-style-type: none"> <li>a. Flash</li> <li>b. Remove what friable Category II nonfriable ACM is safe or accessible</li> <li>c. Friable ACM sealed while wet in bags and nonfriable ACM kept wet in lined containers or dump bodies that will be closed or tarped</li> <li>d. Wet suppression on remaining ACM during demolition</li> <li>e. Load and tarp while wet</li> <li>f. Take to landfill</li> </ul>
Asbestos Only	<ul style="list-style-type: none"> <li>a. Remove what friable or Category II nonfriable ACM is safe or accessible</li> <li>b. Friable ACM sealed while wet in bags and nonfriable ACM kept wet in lined containers or dump bodies that will be closed or tarped</li> <li>c. Wet suppression on remaining ACM during demolition</li> <li>d. Load and tarp while wet</li> <li>e. Take to landfill</li> </ul>
Propellant Only	<ul style="list-style-type: none"> <li>a. Flash</li> <li>b. Push down</li> <li>c. Take tarped loads to landfill</li> </ul>

\* These conditions are probable situations and required responses to satisfy air pollution control requirements in the demolition of Thiokol Area Structures as issued by the Alabama Department of Environmental Management

ACM - Asbestos containing material

asbestos must be removed in accordance with the work practices of Section 61.145[c]. Note, however, that ADEM has provided guidance on how to treat contaminated structures at the Thiokol area depending on types and presence of contaminants (Table 4-1).

The effect of pollutant emissions from newly constructed, reconstructed or modified sources on the ambient air quality must be analyzed to ensure compliance with air quality standards. Some methods of analysis include computer dispersion modeling techniques, source testing, emission factors and engineering judgment by air quality specialists. The purpose of this chapter is to determine the impact that building demolition at RSA will have on air quality. The section is divided into two parts. Part 1 describes how the buildings will be demolished and part 2 provides a qualitative analysis on the impact the demolishing will have on the environment.

#### **4.1.1 Method of Demolition**

There are 76 buildings proposed to be demolished at the RSA Thiokol Plants (see Table 3-1). The buildings will be demolished by flashing or flaming. Flashing involves the use of explosive charges to ignite a fire. Flaming, at RSA, involves placing bails of hay within buildings and then drenching the bails of hay with an ignition fuel to start a fire. In both cases, a Certpak, a temperature monitoring device, will be placed within the building to monitor temperature levels. The Certpaks will verify if the temperature is high enough to allow for proper decontamination of buildings previously contaminated with propellants.

#### **4.1.2 Emissions**

The amount of air pollutants emitted from a given emission source may be estimated using emission factors. Although specific emission factors are not available for demolition operations using combustion techniques, factors developed for open burning of municipal refuse may be used to estimate emissions. The emission factors for open burning of municipal refuse are located in the EPA document AP-42 5<sup>th</sup> edition, *Compilation of Air Pollutant Emission Factors*, Section 2.5 *Open Burning*. There is no specific guidance on how the emission factors for open burning of municipal refuse were developed. But, in most cases, factors are averages of all available data for activities in a source category that relates the quantity of a pollutant released to the atmosphere with an activity associated with the release of that pollutant. For open burning, the quantity of pollutants emitted is based on the area and density of buildings to be burned.

Moreover, pollutant emissions from open burning are affected by many variables, including wind, ambient temperature, composition and moisture content of the source burned, and density of the source. Relatively low temperatures associated with open burning result in inefficient combustion which can increase emissions of particulate matter, carbon monoxide, and hydrocarbons, and suppress emissions of nitrogen oxides. Emissions of sulfur oxides are a direct function of the sulfur content of the refuse being burned.

The demolition/combustion of buildings contaminated with solid propellants has the potential to generate pollutant emissions. Solid propellants are generally a solidified matrix of fuel and oxidizer loaded with metal particles. The combustion of solid propellants will potentially generate emissions of HCl, CO, NO<sub>x</sub> and PM. Data on specific levels of contamination for propellants and other HAPs are not available, and therefore, emissions cannot be quantified. But it is assumed that levels of contamination would not be significant.

For purposes of this impact statement, it is assumed all buildings would be flash burned for worst case analysis. In order to calculate emissions via the emission factors from the total number of

buildings to be demolished, it is assumed the buildings are constructed of wood material and that the average wood construction building has a density of 50 lb/ft<sup>2</sup>. Pollutant emissions (in pounds) are then determined by multiplying the total area of buildings to be burned (ft<sup>2</sup>) x the density of the building (lb/ft<sup>2</sup>) divided by a conversion factor (2,000 lbs/ton) times the emission factor (lb/ton). The emission calculations are shown in **Table 4-2**. A sample calculation for the emission of CO from open burning of all buildings to be demolished is as follows:

$$\frac{300,014 \text{ ft}^2 \times 50 \text{ lb/ft}^2 \times 85 \text{ lb/ton}}{2,000 \text{ lb/ton}} = 637,530 \text{ lbs}$$

The maximum expected pollutant emissions are summarized below.

Pollutant	Emission Factor (lb/ton)	Emissions (total tons)
CO	85	319
NO <sub>x</sub>	6.0	22.5
PM	16	60
PM10	16	60
SO <sub>2</sub>	1.0	3.75
VOC (a)	30	113
HAP (b)	--	Trace amounts

(a) - Data indicate that VOC emissions consist of trace amounts of formaldehyde, a hazardous air pollutant

(b) - The amounts of propellant and RACM present in the buildings is unknown; however, it is reasonable to assume that only trace amounts would be emitted to the atmosphere during demolition activities. If one percent of the buildings' total mass is assumed to be contaminants and all contaminants are assumed to be HAPs, then applying the PM emission factor to that amount would yield only 1,200 lbs total HAP emissions. (7,500 tons x 0.01 x 16 lbs/ton)

Pollutant emissions from demolition operations are fugitive and temporary. The increase of criteria and HAP pollutant emissions from proposed demolition operations would not pose a significant impact to the current ambient air quality, based on engineering judgment. The exact impact can only be determined through detailed engineering estimates and computer dispersion modeling techniques.

**Table 4-2**

**Section 1 Emissions Calculations**

Building	Area (sq ft)	Number at Location	Total Area (sq ft)
7340A	124	1	124
7361	120	1	120
7362	600	1	600
7363A	280	1	280
7602	892	1	892
7605	1,344	1	1,344
7606	5,780	1	5,780
7614	573	1	573
7615	121	1	121
7616	7,883	1	7,883
7617	957	1	957
7618	532	1	532
7641	10,900	1	10,900
7642	1,433	1	1,433
7647	48	1	48
7651	209	1	209
7652	1,128	1	1,128

7653	512	1	512
7654	8,787	1	8,787
7655	864	1	864
7656	72	1	72
7657	120	1	120
7658	72	1	72
7659	120	1	120
7662	431	1	431
7663	13,324	1	13,324
7664	1,050	1	1,050
7665	743	1	743
7667	6,802	1	6,802
7675	19,000	1	19,000
7677	132	1	132
7678	132	1	132
7679	91	1	91
7680	132	1	132
7681	91	1	91
7682	91	1	91
7683	132	1	132
7684	132	1	132
7685	448	1	448
7721	423	1	423
7726	17,409	1	17,409
7728	7,736	1	7,736
7729	1,100	1	1,100
7734	132	1	132
7735	132	1	132
7738	1,306	1	1,306
7739	477	1	477
7561	7,909	1	7,909
7565	108	1	108
7566	108	1	108
7568	3,220	1	3,220
7569	1,978	1	1,978
7572	640	1	640
7574	15,092	1	15,092
7589	149	1	149
7590	310	1	310
7591	310	1	310
7596	6,053	1	6,053
7597	1,110	1	1,110
7598	7,773	1	7,773
3434	41,455	1	41,455
3435	41,488	1	41,488
3490	7,808	1	7,808
3551	423	1	423
3565	1,875	1	1,875
3649	6,019	1	6,019
4373	17,931	1	17,931
4809T	3,139	1	3,139
4810	585	1	585
5655	314	1	314
5675	2,814	1	2,814
5676	3,371	1	3,371
7132	4,428	1	4,428
7846	650	1	650
7877	132	1	132
8014	7,905	1	7,905
<b>Total, All Buildings</b>			<b>300,014</b>

**Table 4-2 (Cont'd)**

Density of Building -50 lb/ft<sup>2</sup>



Total Area of Buildings to be Demolished -300,014 ft<sup>2</sup>

Proposed Mass to be Burned\* -7,500 tons

\* Proposed Mass = Total Area for demolition x Density of building / 2000 lb/ton

**Section 2 Emission factors, from AP-42, Section 2.5 Table 2.5-1 (Municipal Refuse)**

Constituent	Emission Factor
CO	85.0 lb/ton
NO <sub>x</sub>	6.00 lb/ton
Particulate	16.0 lb/ton
PM10 (1)	16.0 lb/ton
SO <sub>x</sub>	1.00 lb/ton
VOC, non-methane	30.0 lb/ton

(1) - Assume PM10 emissions equal to total particulate emissions

**Section 3 Calculation of Actual Criteria Pollutant Emission Rates.**

Constituent	Potential to Emit (lbs)	Potential to Emit (tons)
CO	637,530	319
NO <sub>x</sub>	45,002	22.5
Particulate	120,006	60.0
PM10	120,006	60.0
SO <sub>2</sub>	7,500	3.75
VOC	225,011	113

**4.1.3 No-Action Alternative.** If the no-action alternative is chosen, air quality would not be impacted, since no status changes in the buildings would occur. However, these buildings may advance to a state of disrepair that may cause the contaminants or the asbestos to become airborne, therefore posing a potential health and safety threat to the surrounding public.

**4.1.4 Selective Demolition.** If this alternative is chosen, there would be no significant impacts to air quality due to the selective demolition of the RSA buildings. While periodic demolition of the buildings would produce small amounts of fugitive dust (particulate matter) and construction equipment combustion emissions, activities would be performed on a scheduled basis to not exceed Federal and state NAAQS concentrations.

**4.1.5 Cumulative Impacts.** No cumulative air quality impacts are anticipated for the proposed action in combination with other activities in the area. The proposed actions would take place intermittently, and typically in small areas with minimal amounts of activity occurring at any one time.

**4.1.6 Mitigation Measures.** Demolition activities will be performed on a scheduled basis as to not exceed Federal and state NAAQS concentrations. Heavy equipment vehicles would be equipped with standard pollution control devices to minimize air quality impacts.

## **4.2 BIOLOGICAL RESOURCES**

Criteria for determining the significance of potential impacts to biological resources are based on the relative importance of the resource, the quantity of the resource that would be impacted, the

sensitivity of the resource to the proposed activities, and the duration of the impact. Impacts are considered significant if they are determined to have the potential to result in reduction of the population size of Federally listed or state-listed threatened or endangered species, degradation of biologically important unique habitats, or substantial long-term loss of vegetation and the capacity of a habitat to support wildlife (i.e. negatively impact biodiversity).

Biological diversity (biodiversity), or the variety of life and its processes, is a basic property of nature that provides enormous ecological, economic, and aesthetic benefits. The loss of biodiversity is recognized as a major national as well as global concern with potentially profound ecological and economic consequences.

#### **4.2.1 Proposed Action.**

**Vegetation** - The areas currently occupied by the buildings under consideration for demolition have been in use for over 40 years. Past activities in these areas have cleared much of the native vegetation from around the buildings. There would be potential short-term impacts to existing ground cover, shrubbery, and small trees located near some of the buildings proposed for demolition. Larger trees located near any of the buildings considered for demolition would be protected during demolition and earth moving activities.

**Fish and Wildlife** - As stated in Section 3.2, a variety of wildlife species are known from the Arsenal. Some of these species will find areas around the buildings suitable for forage/cover/resting habitat. Some suitable nesting/den locations are also available near the abandoned buildings. Wildlife can move freely near any of the buildings proposed for demolition. No fishery resources are located near any of the buildings.

**Aquatic Habitats** - No significant aquatic habitats were identified near the buildings proposed for demolition. Implementing the proposed action would have no potential to impact these resources.

**Threatened and Endangered Species** - Since no threatened or endangered species have been identified from areas around the buildings, implementation of the proposed action would not be expected to impact to these resources.

**Unique Habitats** - Since no unique habitats have been identified near any of the buildings, the proposed action would not be anticipated to impact these resources.

**4.2.2 No-Action Alternative.** There would be no impacts to biological resources under the no-action alternative.

**4.2.3 Selective Demolition.** No impacts to biological resources would be anticipated if the buildings were selectively demolished. Buildings where contamination has been identified would be demolished by burning and/or bulldozing and the debris removed to the Arsenal's Solid Waste Disposal Facility (SWDF).

**4.2.4 Cumulative Impacts.** Implementing the proposed action should have positive, cumulative impacts to biological resources, since the Arsenal .....

**4.2.5 Mitigation Measures.** The Arsenal would not remove standing forest crops (hardwood, pine or mixed hardwood/pine) from around building demolition areas. The areas would be revegetated with grasses as soon after demolition as practicable to prevent erosion.

### 4.3 CULTURAL RESOURCES

RSA has recently completed two surveys of structures on the arsenal. The first, performed by Ms. Kelly Nolte and Mr. Michael V. Taylor of Panamerican Consultants, is *Architectural Assessment of the World War II Military and Civilian Works*, U. S. Army Missile Command, Redstone Arsenal, Madison County, Alabama (Final, March 1997). The second, performed by Ms. Ruth D. Nichols of TRC Mariah Associates, is *An Architectural and Historic Inventory of Buildings and Structures Dating to the Cold War-Era (1946-1989) at Redstone Arsenal, Alabama* (Draft, January 1997). According to Jerry M. Hubbard, Director, Directorate of Environmental Management and Planning, U. S. Army Aviation and Missile Command, Redstone Arsenal (AMCOM), in a July 25, 1997 letter to Mr. F. Lawrence Oaks, State Historic Preservation Officer, Alabama Historical Commission:

“The 1996 (Nolte) and 1997 (TRC Mariah) reports have not yet been coordinated with your office. The 1997 (TRC Mariah) report is still in draft form awaiting revisions. The 1996 (Nolte) report is a final report. Due to time constraints placed upon this office to coordinate the results of this report so that demolition of some World War II buildings could proceed, the 1997 Nolte report was accepted and later found to have some inaccuracies and incomplete information.”

The Panamerican Report evaluated structures at RSA using a Category I through IV system which is no longer used by the U. S. Army. These categories will be noted in this EA, although they are no longer in use, because they were the evaluative system utilized by Panamerican. Essentially, Categories I and II are historically significant, and are eligible for the National Register of Historic Places. Categories III and IV are not historically significant, and are not deemed eligible for the National Register. In the absence of any other architectural or historical surveys of World War II and Cold War cultural resources at RSA, these two reports formed the basis for the majority of the analysis contained within this section.

Table 4-3 lists which World War II era buildings are scheduled for demolition, as previously described in the description of proposed action and alternatives section:

<b>Table 4-3</b> <b>World War II Era Buildings Scheduled for Demolition at RSA</b>			
<b>Building #</b>	<b>Building Name/Function</b>	<b>Date of Construction</b>	<b>Remarks</b>
3490	Huntsville Arsenal, Plant Area #3, Smoke Munitions Filling Plant #1, Mixing and Blending Building	1942	
3551	Huntsville Arsenal's Plant Area #3, Incendiary Bomb Plant, Small Magazine	1942	
3565	Huntsville Arsenal's Plant Area #3, Incendiary Bomb Plant, HC Smoke Rifle Grenade Assembly and Packing Change House	1942	
3649	Huntsville Arsenal's Plant Area #3, Smoke Munitions Filling Plant #2, HC Smoke, MI, 105-mm Canister Fill and Press	1942	
T-4809	Possibly part of Redstone Army Airfield?	1942	Not Evaluated in World War II Study

5655	Huntsville Arsenal, Plant Area #2, Ethylene Generator Building	1943	
5675	Huntsville Arsenal, Plant Area #2, CG (Phosgene) Plant, Carbon Monoxide Manufacturing Plant	1943	
5676	Huntsville Arsenal, Plant Area #2, CG (Phosgene) Plant, Catalyzer Building	1943	
7132	Redstone Ordnance Plant, Magazine Area, Finished Ammunition Magazine	1945	
7602	Redstone Ordnance Plant North Plant-Line 5 Burster Service Magazine	1942	
7605	Redstone Ordnance Plant North Plant-Line 5 155mm Chemical Shell Line Office	1942	
7606	Redstone Ordnance Plant North Plant-Line 5 Change House	1942 - 1943	Also evaluated in Cold War Study
7614	Redstone Ordnance Plant North Plant-Line 5 Industrial Building	ca. 1941-1946	
7615	Redstone Ordnance Plant North Plant-Line 5 Vacuum Pump House	ca. 1941-1946	
7616	Redstone Ordnance Plant North Plant-Line 5 Industrial Building	ca. 1941-1946	
7617	Redstone Ordnance Plant North Plant-Line 5 Industrial Building	ca. 1941-1946	
7618	Redstone Ordnance Plant North Plant-Line 5 Industrial Building	ca. 1941-1946	
7641	Redstone Ordnance Plant North Plant, Lines 1 and 5, Unidentified Support Structure	ca. 1941-1946	Believed to be a Barracks
S-7642	Redstone Ordnance Plant, North Plant, Unknown Industrial Building	ca. 1941-1946	Temporary Structure Constructed to Support North Plant Production Lines
7651	Redstone Ordnance Plant, North Plant-Line 1, Service Magazine and Rest House	1941	
7652	Redstone Ordnance Plant, North Plant-Line 1, Tetryl Screening and Blending Building	1941	
7653	Redstone Ordnance Plant, North Plant-Line 1, Tetryl Service Magazine and Rest House	1941	
7654	Redstone Ordnance Plant, North Plant-Line 1, Tetryl Pelleting House	1941	
7655	Redstone Ordnance Plant, North Plant-Line 1, Unidentified Industrial Building	ca. 1941-1946	
7656	Redstone Ordnance Plant, North Plant-Line 1, Vacuum Sweep House	ca. 1941-1946	
7657	Redstone Ordnance Plant, North Plant-Line 1, Vacuum Sweep House	1941	
7658	Redstone Ordnance Plant, North Plant-Line 1, Vacuum Sweep House	ca. 1941-1946	
7659	Redstone Ordnance Plant, North Plant-	1941	

	Line 1, Vacuum Pump House		
7662	Redstone Ordnance Plant, North Plant-Line 1, Service Magazine and Tetryl Pellet Rest House	1941	
7663	Redstone Ordnance Plant, North Plant-Line 1, Burster Charge Loading and Assembly	1941	
7664	Redstone Ordnance Plant, North Plant-Line 1, Unknown Industrial Building	ca. 1941-1946	
7665	Redstone Ordnance Plant, North Plant-Line 1, Unknown Industrial Building	ca. 1941-1946	
7667	Redstone Ordnance Plant, North Plant-Line 1, Change Building	1941	
7675	Possibly part of Redstone Ordnance Plant, North Plant-Line 1?	1942	Not Evaluated in World War II Study?
7677	Redstone Ordnance Plant, North Plant-Line 1, Vacuum Pump House	1941-1942	
7678	Redstone Ordnance Plant, North Plant-Line 1, Vacuum Collector Building	1941-1942	
7680	Redstone Ordnance Plant, North Plant-Line 1, Vacuum Pump House	1942	
7681	Redstone Ordnance Plant, North Plant-Line 1, Vacuum Collection Building	ca. 1941-1946	
7682	Redstone Ordnance Plant, North Plant-Line 1, Vacuum Collection Building	ca. 1941-1946	
7683	Redstone Ordnance Plant, North Plant-Line 1, Unknown Industrial Building	1942	
7684	Redstone Ordnance Plant, North Plant-Line 1, Unknown Industrial Building	ca. 1941-1946	
7685	Redstone Ordnance Plant, North Plant-Line 1, Remote Control Switch Station	1943	
7721	Redstone Ordnance Plant, North Plant-Line 2, Explosives Magazine	1942	
7726	Redstone Ordnance Plant, North Plant-Line 2, Pellet and Pour House	1942	
7728	Redstone Ordnance Plant, North Plant-Line 2, Change Building and Bomb Proof House	1941	
7729	Redstone Ordnance Plant, North Plant-Line 2, Boiler House	1941	
7734	Redstone Ordnance Plant, North Plant-Line 2, Unknown Industrial Building	1942	
7735	Redstone Ordnance Plant, North Plant-Line 2, Vacuum Pump House	1942	
7738	Redstone Ordnance Plant, North Plant-Line 2, Tetryl Screening Building	1945	
7739	Redstone Ordnance Plant, North Plant-Line 2, TNT Screening Building	1945	
7561	Redstone Ordnance Plant, South Plant-Line 3, Locker Rooms and Change House	1942	
7565	Redstone Ordnance Plant, South Plant-Line 3, Unknown Industrial Building	1945	
7572	Redstone Ordnance Plant, South Plant-Line 4, Standard Magazine	1942	also known as "Conditioning Building"
7574	Redstone Ordnance Plant, South Plant-Line 4, Loading and Assembly/ Packing and Shipping	1942	

8014	Gulf Chemical Warfare Depot, Administrative Area, Police and Fire House	1942	
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Building 3490 belongs to Huntsville Arsenal's Plant Area #3, Smoke Munitions Filling (SMF) Plant #1. Plant Area #3 had the mission of filling smoke munitions. Building 3490 was a generic mixing and blending building that had a simple, large, open floor plan and specialized equipment that could be easily re-calibrated. This building was thus a flexible industrial facility. SMF Plant #1 has been previously assessed by Panamerican Consulting in their *WW II Architectural Assessment of Redstone Arsenal*. This assessment noted that:

“...these buildings were easily adapted after WW II to any number of uses from barracks to classrooms to gymnasiums. All of these buildings were made of typical WW II materials and styles as discussed earlier. None of these structures hold any unique or significant role in the WW II history of RSA, the State, or the Nation. The SMF Plant #1 structures should be rated as Army Category IV buildings. The SMF Plant #1 buildings do not qualify for inclusion on the NRHP at this time.” (U.S. Army Missile Command, 1997b)

The demolition/destruction of Building 3490 would result in no impacts to cultural resources at RSA.

Buildings 3551 and 3565 belong to Huntsville Arsenal's Plant Area #3, Incendiary Bomb Plant. This plant was responsible for manufacturing and filling incendiary ordnance ranging from thermite hand grenades to air delivered bombs. The Incendiary Bomb Plant has been previously assessed by Panamerican Consulting in their *WW II Architectural Assessment of Redstone Arsenal*. This assessment noted that:

“None of these buildings are unique, having all been constructed of traditional WW II materials using WW II industrial plans. The Incendiary Bomb Plant structures should be rated as Army Category IV buildings. The Incendiary Bomb Plant structures do not qualify for inclusion on the NRHP at this time.” (U.S. Army Missile Command, 1997b)

The demolition/destruction of Buildings 3551 and 3565 would result in no impacts to cultural resources at RSA.

Building 3649 belongs to Huntsville Arsenal's Plant Area #3, SMF Plant #2. Plant Area #3 had the mission of filling smoke munitions. SMF Plant #2 has been previously assessed by Panamerican Consulting in their *WW II Architectural Assessment of Redstone Arsenal*. This assessment noted that:

“None of these buildings are unique, having all been constructed of traditional WW II materials using industrial plans of the period. None of these structures hold any unique or significant role in the WW II history of RSA, the State, or the Nation. The SMF Plant #2 structures should be rated as Army Category IV buildings. The SMF Plant #2 buildings do not qualify for inclusion on the NRHP at this time.” (U.S. Army Missile Command, 1997b)

The demolition/destruction of Building 3649 would result in no impacts to cultural resources at RSA.

Building T-4809 is a World War II era temporary building constructed to support Redstone Army Airfield. This building was not assessed in Panamerican's *WW II Architectural Assessment of Redstone Arsenal*. The Department of Defense, the Advisory Council on Historic Preservation, and the State Conference of State Historic Preservation Officers signed a Programmatic Agreement (PA) in July, 1986 which addressed the demolition of World War II temporary buildings. This PA stipulated that demolition of these building can proceed, following the completion of a comprehensive HABS/HAER inventory of these structures and their history. However, subsequent elucidation of this PA has noted that World War II temporary structures must still be assessed for their local and state significance, and must still be assessed for their association with persons and events significant in American history. No such evaluation of this building has been performed by RSA. Indeed, this building has not been assessed to ascertain the type of structure, or the purpose for which it was constructed. Therefore, additional research on this structure is required before it can demolished in accordance with the July, 1986 PA.

Building 5655 is a miscellaneous building in Plant Area #2 of the Huntsville Arsenal. A number of buildings could not be assigned to a specific plant function, and are considered to be miscellaneous buildings. According to Panamerican's survey:

“All of the structures...are typical of military WW II industrial architecture and are found throughout Redstone Arsenal. These structure are not unique and have played no special role in the development of Redstone Arsenal, the state, or the Nation. The structures are currently well maintained and should be rated as Army Category IV buildings. The miscellaneous Plant #2 buildings do not qualify for inclusion on the NRHP at this time.” (U.S. Army Missile Command, 1997b)

There would be no impact to cultural resources at RSA caused by the demolition/destruction of Building 5655.

Buildings 5675 and 5676 are located in Huntsville Arsenal, Plant Area #2, CG (Phosgene) Plant. This plant manufactured phosgene, a poisonous gas first used by the Imperial German Army at Verdun in 1916. Phosgene is manufactured by combining chlorine and carbon monoxide in the presence of a catalyst. The plant began production in February 1944 and ended January 1945. This production line was constructed of typical model buildings based upon ones at Edgewood Arsenal, and most of the production line no longer exists. Building 5675, the Carbon Monoxide Manufacturing Plant and Building 5676, the Catalyzer Building, have both been extensively remodeled. Panamerican Consultants stated that:

“Not enough of production line remains to provide any real information on the manufacturing sequence. The CG plant structures are not distinctly unique structures and have played no special role in the development of RSA, the State, or the Nation. The structures currently are well maintained and should be rated as Army Category IV buildings. The CG plant buildings do not qualify for inclusion on the NRHP at this time.” (U.S. Army Missile Command, 1997b)

There would be no impact to cultural resources at RSA caused by the demolition/destruction of Buildings 5675 and 5676.

Building 7132 is located in the Magazine Area of the old Redstone Ordnance Plant. Building 7132 is a concrete foundation, construction-tiled, rectangular, warehouse-type, finished ammunition magazine, 51' wide by 240' long with five large, sliding loading doors. Building

7132 is one of many nearly identically designed and constructed magazines. Panamerican Consultants noted:

“These structures are of standard military design and offer no unique information architecturally or historically. The structures in this magazine area are well maintained and actively used. They should be maintained as Army Category IV properties. They are not eligible for the NRHP at this time.” (U.S. Army Missile Command, 1997b)

There would be no impact to cultural resources at RSA caused by the demolition/destruction of Building 7132.

Buildings 7602, 7605, 7606, 7614, 7615, 7616, 7617 and 7618 all belong to the old Redstone Ordnance Plant's North Plant-Line 5. Line 5 was a chemical loading line completed in 1943. Line 5 has been previously assessed by Panamerican Consulting in their *WW II Architectural Assessment of Redstone Arsenal*. This assessment noted that:

“Line 5 appears to have changed drastically across time...as a consequence it is very difficult to actually find the original buildings and site plan. These changes have been poorly documented.... Given the much changed nature of Line 5, it should be designated as an Army Category IV property. Line 5 does not qualify for nomination to the NRHP.” (U.S. Army Missile Command, 1997b)

There would be no impact to cultural resources at RSA caused by the demolition/destruction of these buildings.

Building 7641 is a support facility to Redstone Ordnance Plant's North Plant - Lines 1 and 5. The Panamerican study failed to locate any documentation on this building, but noted that it appears to be a barracks building. They note that if their assessment is correct, that this is the only surviving World War II barracks building on RSA. (U.S. Army Missile Command, 1997b) Although a World War II era barracks building is not nationally or regionally significant, the fact that this is the last remaining barracks on RSA is locally significant. Between 1941-1945, hundreds of such barracks existed on RSA. These buildings were the primary residences for thousands of soldiers and civilians. The removal of this building would remove the last example of this particular type of structure. Before this building is demolished, additional archival and architectural research must be performed which is beyond the scope of this Environmental Assessment. Panamerican stated that:

“... it is strongly recommended that this structure receive documentation at a Level III of the HABS.” (U.S. Army Missile Command, 1997b)

It is recommended that this building be evaluated against the following two studies to ascertain its architectural type:

U. S. Army Corps of Engineers, Construction Engineering Research Laboratories, *World War II Temporary Military Buildings, A Brief History of the Architecture and Planning of Cantonments and Training Stations in the United States* (USACERT Technical Report CRC-93/01, March 1993), and

United States Department of Defense, Legacy Resource Management Program and National Park Service, Historic American Building Survey/Historic American Engineering Record, *World War*



*II and the U. S. Army Mobilization Program: A History of 700 and 800 Series Cantonment Construction.*

If this building is determined to be a World War II era barracks building, its destruction would result in a significant impact to cultural resources at RSA.

It should be noted that the Department of Defense, the Advisory Council on Historic Preservation, and the State Conference of State Historic Preservation Officers signed a Programmatic Agreement (PA) in July, 1986 which addressed the demolition of World War II temporary buildings. This PA stipulated that demolition of these building can proceed, following the completion of a comprehensive HABS/HAER inventory of these structures and their history. However, subsequent elucidation of this PA has noted that World War II temporary structures must still be assessed for their local and state significance, and must still be assessed for their association with persons and events significant in American history. No such evaluation of this building has been performed by RSA. Indeed, this building has not been assessed to ascertain the type of structure, or the purpose for which it was constructed. Therefore, additional research on this structure is required before it can demolished in accordance with the July, 1986 PA.

Building S-7642 is an unknown industrial building of temporary construction, surmised to have been constructed to support Redstone Ordnance Plant's North Plan production lines. According to Panamerican:

"It has no unique role.... It should be designated an Army Category IV structure." (U.S. Army Missile Command, 1997b)

Accordingly, there would be no impact to cultural resources at RSA caused by the demolition/destruction of this unidentified structure.

Buildings 7651, 7652, 7653, 7654, 7655, 7656, 7657, 7658, 7659, 7662, 7663, 7664, 7667, 7677, 7678, 7680, 7681, 7682, 7683, 7684 and 7685 all belong to the Redstone Ordnance Plant's North Plant-Line 1. Line 1 was the first line to be completed at Redstone Ordnance Plant. This burster or shell loading line was completed in March, 1942. Line 1 has been previously assessed by Panamerican Consultants in their *WW II Architectural Assessment of Redstone Arsenal*. This assessment noted that:

"It is recommended that Line 1 be maintained as an Army Category II property until research can be completed regarding the relationship between Ravenna and Redstone Ordnance Plant's Line 1. For National Register of Historic Places nomination, Line 1 buildings should be considered a district and would fall under criteria A and D. This nomination would require an intensive level survey to be conducted on the buildings." (U.S. Army Missile Command, 1997b)

Line 1 represents a significant collection of a nearly intact World War II military manufacturing line. Regrettably, these buildings have been seriously contaminated with chemicals and/or rocket propellants by both World War II and post-war activities. For safety considerations, Line 1 will have to be demolished/destroyed. Before any such demolition is performed, Historic American Building Survey/Historic American Engineering Record (HABS/HAER) recordation of Line 1 should be performed. Section 110 (b) of the National Historic Preservation Act (NHPA), as amended (16 U.S.C. 470h-2), states that:

Each Federal agency shall initiate measures to assure that where, as a result of Federal action...a historic property is to be substantially altered or demolished, timely steps are taken to make or have made appropriate records, and that such records then be deposited, in accordance with Section 101 (a) in the Library of Congress or with such other appropriate agency as may be designated by the Secretary [of the Interior as defined in Section 301, 16 U.S.C. 470w], for future use and reference.

The program established by the Secretary of the Interior to fulfill this requirement of the NHPA is known as the Historic American Building Survey/Historic American Engineering Record. The goal of the HABS/HAER collections is to provide architects, engineers, scholars, and interested members of the public with comprehensive documentation of buildings, sites, structures and objects significant in American history and the growth and development of the built environment. HABS/HAER documentation usually consists of measured drawings, photographs and written data that provide a detailed record which reflects a property's significance. Documentation is often the last means of preservation of a property; when a property is to be demolished, its documentation provides future researchers access to valuable information that otherwise would be lost.

AMCOM, RSA has stated to the Alabama State Historic Preservation Officer, Alabama Historical Commission in two letters dated July 3, 1997 and July 25, 1997 that they intend to document buildings to be demolished with the following documentation:

- Copies of state approved historic and architectural resources inventory forms for each building for the WWII context for RSA. The Architectural Inventory Record forms for the Cold War context for RSA for each building when appropriate;
- 8" by 10" black and white photographs of the four sides of each building;
- Copies of the 1996 Nolte report and the 1997 TRC Mariah report;
- Copies of the environmental baseline studies for the north and south plants of the RARE Facility (the former North and South Thiokol Plants).[RSA Letters, July 3, 1997 and July 25, 1997]

The environmental baseline studies document the asbestos and explosives contamination in the structures. The historic and architectural inventory forms, and 8" x 10" black and white photographs of the four sides of the building, are commensurate with a Level IV HABS/HAER documentation effort. The Secretary of the Interior has stated:

Level IV documentation consists of completed HABS/HAER Inventory Cards. This level of documentation, unlike the other three levels, is rarely considered adequate documentation for the HABS/HAER collections but is undertaken to identify historic resources in a given area prior to additional, more comprehensive documentation. [U. S. Secretary of the Interior, Secretary of the Interior's Standards and Guidelines for Architectural and Engineering Documentation, HABS/HAER Standards (Washington, D.C.: U. S. Department of the Interior, 1990), p. 6.]

HABS/HAER documentation must be submitted to the Library of Congress, through the National Park Service. The RSA documentation is intended only for the Alabama Historical Commission. Additionally, HABS/HAER documentation is performed to rigorous archival standards, such that the information is expected to last 500 years. Examples of archival standards to ensure this include the use of specific materials which were not utilized in the RSA documentation. The HABS/HAER documentation is also involved with a survey of not only the exterior and use of a structure, but with the construction and design details, interior layout, tools, machinery, manufacturing processes, technological innovations and other aspects of the structure's functions.

This is done, in part, through large format photography and measured engineering drawings. The RSA documentation, again, fails to achieve these standards.

Because of health considerations, a review should be performed to ascertain the highest level of HABS/HAER recordation that can be safely performed. It should be noted, however, that similar surveys have previously been conducted under much more challenging environmental situations. For example, an archaeological survey of a mid-Nineteenth Century industrial site was performed as a component of a Superfund cleanup:

The level of potential heavy-metal contamination within the historic shoreline landfill, as well as deep-winter conditions at the site, dictated that the field team work in protective gear, under inflated and heated domes, with all essential laboratory activities incorporated into on-site facilities outfitted with the appropriate decontamination equipment. Heavy dewatering pumps operated on a twenty-four-hour basis to maintain the excavation site in a dry, workable condition. All field personnel worked in sealed protective suits which were decontaminated and disposed of daily. All crew members were trained and certified for Hazardous Waste Material Handling (HAZMAT), and all were medically monitored before, during, and after the field effort. (Geier and Winter, 1994)

Although the State Historic Preservation Officer has found the minimal level of documentation of the World War II and Cold War facilities to be acceptable in a letter dated September 16, 1997, it is our considered professional opinion that this documentation fails to achieve the mitigative measures for historically significant facilities required by Federal law as mandated by the NHPA. Significant historic information will be permanently and irreparably lost on nationally significant historical topics:

- the industrial mechanization of the United States prior to and during World War II;
- chemical production and distribution during World War II;
- military ordnance production and distribution during World War II;
- World War II era military industrial architecture;
- conversion of military assembly lines to civilian utilization;
- the history of the development of America's rocket and missile capability.

Demolition or destruction of the Line 1 structures at RSA (Buildings 7651, 7652, 7653, 7654, 7655, 7656, 7657, 7658, 7659, 7662, 7663, 7664, 7667, 7677, 7678, 7680, 7681, 7682, 7683, 7684, and 7685), without adequate mitigation, constitutes a significant adverse impact to the cultural landscape of RSA. Should HABS/HAER Level I, II, or III documentation be performed for this industrial production line, this significant adverse impact will be mitigated to a not-significant adverse impact.

Because these buildings are to be destroyed in the near future, nomination to the National Register of Historic Places is not recommended.

Buildings 7721, 7726, 7728, 7729, 7734, 7735, 7738 and 7739 all belong to the Redstone Ordnance Plant's North Plant- Line 2. Line 2 was intended to be nearly identical to Line 1, but because it was constructed after Line 1 went into operation it contained technical changes, revisions and modifications based upon Redstone Ordnance Plant's experience with Line 1. This burster or shell loading line was completed in 1942, and was expanded in 1945. Line 2 has been previously assessed by Panamerican Consultants in their *WW II Architectural Assessment of Redstone Arsenal*. This assessment noted that:

“It is recommended that Line 2 be maintained as an Army Category II property until further research can be completed on the similarities between the lines at Redstone Ordnance Plant and Ravenna Ordnance Plant. For NRHP nomination, Line 2 buildings should be considered as a district and would fall under criteria A and D. This nomination would require an intensive-level survey to be conducted on the administrative area buildings.” (U.S. Army Missile Command, 1997b)

Line 2 represents a significant collection of a nearly intact World War II military manufacturing line. Regrettably, these buildings have been seriously contaminated with chemicals and/or rocket propellants by both World War II and post-war activities. For safety considerations, Line 2 will have to be demolished/destroyed. Demolition or destruction of the Line 2 structures at RSA without adequate mitigation, constitutes a significant adverse impact to the cultural landscape of RSA. Should HABS/HAER Level I, II, or III documentation be performed for this industrial production line, this significant adverse impact will be mitigated to a non-significant adverse impact. Because of health considerations, a review should be performed to ascertain the highest level of HABS/HAER recordation that can be safely performed. It should be noted, however, that similar surveys have previously been conducted under much more challenging environmental situations, as previously discussed for Line 1. Because these buildings are to be destroyed in the near future, nomination to the National Register of Historic Places is not recommended.

Buildings 7561 and 7565 belong to the Redstone Ordnance Plant's South Plant-Line 3. Line 3 was a chemical shell loading line that began manufacturing operations on April 28, 1942. Known as "The Redstone Line" Line 3 proved more efficient than a similar line at Picatinny Arsenal, and modifications and changes incorporated into Line 3 were subsequently incorporated at the Picatinny Arsenal line. Line 3 underwent an extensive mechanization upgrade in 1944. Line 3 has been previously assessed by Panamerican Consultants in their *WW II Architectural Assessment of Redstone Arsenal*. This assessment noted that:

“...Line 3 is an intact line...it seems apparent that more research must be completed on Line 3 before a real decision can be made as to its permanent status. It is recommended that...Line 3 be designated as an Army Category II property until further research work can be completed. For NRHP nomination, Line 3 buildings should be considered a district and would fall under criteria A and D. This nomination would require an intensive-level survey to be conducted on the buildings.” (U.S. Army Missile Command, 1997b)

Building 7561 was the Change House for Line 3, and Building 7579 was the boiler house for Line 3. These buildings were not connected to Line 3 by ramps. Although these buildings were not functional or technical buildings where actual manufacturing occurred, they are still integral elements of the line. Panamerican Consulting recommended that Line 3 is eligible for the National Register of Historic Places as a district. Accordingly, demolition of these two buildings, even if the remainder of Line 3 was preserved, would still constitute a significant adverse impact to the cultural resources of RSA. These buildings should not be dismantled until HABS/HAER research and recordation is accomplished for the entire Line 3. These two buildings should be incorporated into and included in any future planning for Line 3, and should not be destroyed until a comprehensive decision can be made regarding Line 3's future.

Buildings 7572 and 7574 belong to the Redstone Ordnance Plant's South Plant-Line 4. Line 4 was a chemical shell loading line that began manufacturing operations on August 3, 1942. Line 4 was known as "The Picatinny Line" because it was identical to a similar line at Picatinny Arsenal. Once "The Redstone Line" was proven more efficient, Line 4 was modified in accordance with

Line 3. Line 4 has been previously assessed by Panamerican Consultants in their *WW II Architectural Assessment of Redstone Arsenal*. This assessment noted that:

“Line 4 has changed dramatically across time. The covered ramps are gone, and the large buildings on the line have undergone numerous conversions to the point that the WW II fabric cannot be seen. Only the basic form belies the buildings' ages. ...it does not seem necessary at this time to place Line 4 above Category IV. Line 4 is not eligible at this time for nomination to the NRHP. (U.S. Army Missile Command, 1997b)

There would be no impact to cultural resources at RSA caused by the demolition/destruction of Buildings 7572 and 7574.

Building 8014 is a former Police and Fire Station located in the Administrative Area, Gulf Chemical Warfare Depot (GCWD). Although there are other extant Police and Fire Stations located on RSA (each base had at least one and Huntsville Arsenal apparently had several), according to Panamerican:

"...this is the best preserved and certainly the most architecturally interesting."

A blueprint has been located for this building, but no research on its architecture has been performed. Panamerican also noted:

"In the past, this structure was used as the yacht club, but today is abandoned. It is one of very few structures on Redstone Arsenal that may have architectural significance. As such, it should be listed as an Army Category III property."

Intensive, focused research has been performed under the now defunct Department of Defense Legacy Resource Management Program on 700 and 800 series World War II barracks. No comparable study has been performed on support and administrative structures. This building lends itself well to make a contribution to such a study. Panamerican did state that:

"The GCWD fire house is not eligible for the NRHP at this time." However, it is apparent that this statement is made in the absence of archival and architectural research. It is recommended that an intensive-level survey be conducted to determine if the structure was built using standard WW II plans and to further document its use." (U.S. Army Missile Command, 1997b)

The destruction of this building would result in a not significant impact to cultural resources at RSA. Focused, intensive archival and architectural research needs to be performed for this structure. HABS Level I recordation should be performed. This research plan should provide recommendations for the building's permanent maintenance and use at RSA, and should reevaluate its eligibility for the National Register of Historic Places. This Police and Fire Station should not be destroyed or demolished, and should be permanently retained at RSA.

Table 4-4 lists which Cold War era buildings are scheduled for demolition, as previously described in the description of proposed action and alternatives:

<b>Table 4-4</b>			
<b>Cold War Era Buildings Scheduled for Demolition at RSA</b>			
<b>Building #</b>	<b>Building Name/Function</b>	<b>Date of Construction</b>	<b>Remarks</b>

3434		1960	
3435		1960	
4373		1977	
4810		1960	
7340A		1960	
7361		1961	
7362		1961	
A-7363		1959	
7647	Large Hydrostatic Test Tower	1967	Assessed in Cold War study
7566		1962	
7568		1954	
7606	World War II - Change Facility for Redstone Ordnance Plant, North Plant - Line 5 Cold War - Solvent Storage for North Thiokol Solid Propellant Processing Plant	ca. 1942-1943	Assessed in both World War II and Cold War Studies
7679		1959	
7589		1951	
7590		1951	
7591		1951	
7596	South Thiokol Area, Propellant Facility	1955	Assessed in Cold War study
7597	South Thiokol Area, Propellant Facility	1955	Assessed in Cold War study
7598	South Thiokol Area, Propellant Facility	1955	Assessed in Cold War study
7846		1968	

Buildings 3434, 3435, 4373, 4810, 7340A, 7361, 7362, A-7363, 7566, 7568, 7589, 7590, 7591, 7679 and 7846 have been previously deemed ineligible for the National Register of Historic Places by the U. S. Army Corps of Engineers, Fort Worth District in *An Architectural and Historic Inventory of Buildings and Structures Dating to the Cold War Era (1949-1989) at Redstone Arsenal, Alabama* (U.S. Army Corps of Engineers, 1997). The demolition/destruction of these buildings would result in no impacts to cultural resources at RSA.

Building 7606, Solvent Storage Building for the North Thiokol Solid Propellant Processing Plant, is a World War II era building assessed by both Panamerican Consulting in their *WW II Architectural Assessment of Redstone Arsenal.*, and by the Corps of Engineers, *Inventory of Cold War Buildings and Structures*. Panamerican noted concerning the World War II History of Line 5:

“Line 5 appears to have changed drastically across time, and, as a consequence, it is very difficult to actually find the original buildings and site plan.... Given the much changed nature of Line 5, it...does not qualify for nomination to the NRHP.”

However, although Building 7606 is not eligible for the National Register because of its World War II contributions, it did make significant contributions during the Cold War era, as assessed by the Corps of Engineers:

This facility is an integral component of an early building complex used by Thiokol Corporation to produce solid propellants for rocket and missile motors.... This facility is [eligible for the National Register] under Criteria A/Criteria Consideration G. All buildings and structures within district boundaries meet eligibility criteria based on their use in rocket and defense missile system developments that directly support U. S. defense activities throughout the Cold War era.

The demolition/destruction of Building 7606 would result in a significant impact to cultural resources at RSA. Demolition/destruction of Building 7606 should be deferred until the historic significance of the entire North Thiokol Solid Propellant Processing Plant is comprehensively addressed.

Building 7647, Large Hydrostatic Test Tower, was assessed in the Corps of Engineers, *Inventory of Cold War Buildings and Structures*. This survey determined that because the structure has had its original equipment removed, and because it is a standardized style production facility that does not represent exceptional historic significance, that this structure is not eligible for the National Register. (U.S. Army Corps of Engineers, 1997) The demolition/destruction of this building would result in no impacts to cultural resources at RSA.

Buildings 7596, 7597, 7598 are Propellant Facilities located in the South Thiokol Area. These buildings were all integral to early rocket motor propellant research and development. However, they have been vacant since 1970. All three buildings were assessed by the Corps of Engineers in *Inventory of Cold War Buildings and Structures*:

“This property...no longer retains integrity that would qualify it for National Register listing. Although the site was used for early propellant research, which was integral to early Cold War era defense missions, it has suffered great loss of integrity due to missing exterior walls and removal of all interior equipment. This building, vacant since 1970, no longer exhibits a "sense of time and place" which is necessary for a property to be listed on the National Register of Historic Places.” (U.S. Army Corps of Engineers, 1997)

The demolition/destruction of these buildings would result in no impacts to cultural resources at RSA.

Demolition/Destruction of the buildings will involve ground disturbance to an approximate depth of six inches, in the immediate vicinity around the involved buildings. Because of extensive ground disturbance that occurred during the construction of these buildings during World War II and the Cold War era, no prehistoric or historic subsurface cultural resources should be affected by this project. There are no known Native American traditional use or religious sites effected by this project.

**4.3.1 Proposed Action.** There would be no significant impacts expected to cultural resources under the proposed action. However, should a cultural resources survey find historical significance with any of the buildings proposed for demolition, the Cultural Resources Manager will determine in consultation with the SHPO any action that may be warranted.

If government or contractor personnel observe items that might have historical or archaeological significance during borrow area activities, they will report their observations immediately to the Arsenal's Cultural Resources Manager to determine their significance and any special disposition of the finds. Activities in the area of the discovery that may result in the destruction of these resources would cease and personnel would be prevented from trespassing on, removing, or otherwise damaging such resources.

Demolition/destruction of the following 38 buildings can proceed with no impacts to cultural resources and no mitigations are required:

- Huntsville Arsenal, Plant Area #2, Building 5655
- Huntsville Arsenal, Plant Area #2, CG (Phosgene) Plant, Buildings 5675, 5676
- Huntsville Arsenal, Plant Area #3, SMF Plant #1, Building 3490
- Huntsville Arsenal, Plant Area #3, Incendiary Bomb Plant, Buildings 3551, 3565
- Huntsville Arsenal, Plant Area #3, SMF Plant #2, Building 3649
- Redstone Ordnance Plant, Magazine Area, Building 7132

- Redstone Ordnance Plant, North Line, Line 5, Buildings 7602, 7605, 7606, 7614, 7615, 7616, 7617, 7618
- Redstone Ordnance Plant, North Line, Building S-7642
- Redstone Ordnance Plant, South Line, Line 4, Buildings 7572 and 7574
- Miscellaneous Cold War era structures, Buildings 3434, 3435, 4373, 4810, 7340A, 7361, 7362, A-7363, 7566, 7568, 7589, 7590, 7591, 7679, 7846
- Building 7647, Large Hydrostatic Test Tower
- Propellant Facilities, South Thiokol Area, Buildings 7596, 7597, 7598.

**4.3.2 No-Action Alternative.** There would be potential negative impacts to cultural resources under the no-action alternative, since there would be no clearly defined plan for the care and upkeep of the buildings and inadvertent destruction of cultural resources could occur.

**4.3.3 Selective Demolition.** This is a viable alternative, since the Army could comply with National Historic Preservation Act requirements to preserve and protect prehistoric and historic resources under this alternative.

**4.3.4 Mitigation Measures.** Several mitigation measures are required, since cultural resource impacts are identified under the proposed action. Consultation with the SHPO would occur regarding the Phase I Archeological Reconnaissance Survey underway and the World War II Historical Architecture Reconnaissance Survey recently completed. A summary of the mitigation measures for cultural resources is presented in Chapter 5, Conclusions and Mitigations Summary.

Building T-4809 is a World War II era temporary building constructed to support Redstone Army Airfield. This building has not been adequately addressed to ascertain the type of structure, or the purpose for which it was constructed. Therefore, additional research on this structure is required before it can be demolished in accordance with the July, 1986 PA between DoD, ACHP, and the State Conference of SHPOs.

Demolition/destruction of Building 8014 would result in a not significant adverse impact to cultural resources at RSA. This building is a Police and Fire Station, Administrative Area, Gulf Chemical Warfare Depot. Focused, intensive archival and architectural research needs to be performed for this structure. HABS Level I recordation should be performed. This research plan should provide recommendations for the building's permanent maintenance and use at RSA, and should reevaluate its eligibility for the National Register of Historic Places. This Police and Fire Station should not be destroyed or demolished, and should be permanently retained at RSA. However, because there are other surviving examples of this type of building at RSA, its demolition/destruction would result in a not significant adverse effect.

Demolition/destruction of buildings 7651, 7652, 7653, 7654, 7655, 7656, 7657, 7658, 7659, 7662, 7663, 7664, 7667, 7677, 7678, 7680, 7681, 7682, 7683, 7684, 7685, 7721, 7726, 7728, 7729, 7734, 7735, 7738 and 7739 would result in a significant adverse impact to cultural resources at RSA without the appropriate mitigative measures. These mitigative measures are detailed in Chapter 5, Section 5.3.

Demolition/destruction of Buildings 7606, 7561, and 7565 would result in a significant adverse impact to cultural resources at RSA without the appropriate mitigative measures as detailed in Chapter 5, Section 5.3.

Demolition/destruction of Building 7641 would result in a significant adverse impact to cultural resources at RSA. There are no mitigative measures. Additional archival and architectural



research should be performed on Building 7641, assumed to be a barracks, to determine its specific architectural type, and recommendations for its permanent maintenance and use at RSA should be investigated. This barracks building should not be destroyed or demolished, and should be permanently retained at RSA.

#### **4.4 HAZARDOUS MATERIALS AND WASTE**

**4.4.1 Proposed Action.** The proposed action is to demolish 76 buildings in an environmentally conscientious and timely manner. There are potential negative impacts regarding hazardous materials and waste from the proposed action. Hazardous materials or waste associated with the demolition of the proposed buildings could be generated from the activities. The Arsenal's SWDF permit, issued by ADEM, for its construction/demolition landfill allows the disposal of up to 600 cubic yards per day of only inert materials such as construction and demolition debris, stumps, limbs, concrete, asphalt, asbestos, and similar type waste or material collected from RSA (Alabama Department of Environmental Management 1995). Some of the buildings to be demolished are contaminated with propellants. Eleven buildings located in the North Plant and eight buildings in the South Plant area have been confirmed to contain propellant contamination. Of the remaining 16 buildings located throughout various areas of RSA, none are known to have any propellant contamination. Two buildings, 7653 and 7728, located within the North Plant area are known to be contaminated with MOCA.

**4.4.2 No-Action Alternative.** If the no-action alternative is chosen, it would require that the Army plan no demolition or reconstruction of any of the 76 buildings selected in this proposed action. The buildings would remain unchanged, therefore, no impacts would be expected.

**4.4.3 Selective Demolition.** Impacts due to selective demolition would depend upon the buildings selected. If contaminated buildings would be selected to be demolished, there would be potential for negative but not significant impacts to hazardous material and waste. If none of the buildings selected for demolition are contaminated there would be no significant impacts to hazardous materials and waste.

**4.4.4 Cumulative Impacts.** No other activities have been identified that, together with the proposed action, would have the potential for cumulative impacts on hazardous materials and waste.

**4.4.5 Mitigation Measures.** ACM's would be generated during the demolition process. The debris would be continuously wet from the time it is burned until it is loaded and tarped, to prevent friable ACMs from becoming airborne. All demolition in the North and South Plants area shall be accomplished by heavy equipment. No hand operated tool demolition shall be allowed in this area. Demolished building sites will be removed to a depth of 2 feet below grade to ensure all the friable ACMs and contamination is removed. All burned building material would be considered asbestos contaminated and shall be hauled to the RSA asbestos landfill.

#### **4.5 HEALTH AND SAFETY**

**4.5.1 Proposed Action.** No significant environmental impacts to Health and Safety are expected by the demolition of the proposed buildings on RSA. Potential, not significant, impacts to Health and Safety would be minimized by applying safety procedures (which include OSHA regulations 29 CFR Parts 1910 and 1926; Army Regulation 385-100, *Safety*; EM 385-1-1, *Army Corps of Engineers Safety and Health Requirements Manual*; and the Base Operating Contractor's approved safety plan) would be followed during demolition activities.

A review of accepted safe procedures for explosive decontamination was performed. Additionally, two recent specifications regarding explosive decontamination were reviewed. One involving Umatilla Army Depot, OR which was the site of a contamination remediation of an explosive wash-out facility, the second at Fort Wingate, NM was concerned with the demolition of a building similar to the majority of the proposed buildings at RSA. The Specification Numbers are listed below. Both of these specifications and the main Decontamination reference TB 700-4, *Decontamination of Facilities and Equipment* involve processes necessary to effectively and safely decontaminate structures exactly like the proposed action buildings. All three require Flashing/Flaming of the explosively contaminated buildings with a check method to insure sufficient temperature has been reached in order that a positive decontamination has been accomplished. These methods are the utilization of Certpaks per a stringent procedure which allows for the determination of temperatures being achieved which effectively decontaminated the explosive. Additionally, both of the specifications address the abatement of asbestos in the buildings prior to performing flaming of the structures.

A review of all available documentation concerning the buildings proposed for demolition and their potential explosive aspects and past uses was accomplished. This documentation revealed extensive explosive operations were conducted in a number of the affected buildings, to include World War II uses. As most of the affected buildings had been utilized for propellant operations by Thiokol, specific decontamination records for the buildings were located at the U.S. Army Missile Command Safety Office. This aspect of the analysis is as follows:

Initial review found that a master set of Decontamination Procedures was developed that could apply to any specific building based on the potential source or sources of the contamination. Each building in the Thiokol complex then had an individual Decontamination Plan developed, based on the known or suspected contamination present in that building. A review of the procedures and plans was performed to ascertain what was specifically decontaminated. The only indication as to what had occurred was a one page signature sheet in the front of each plan stating decontamination had occurred. There was no checklist or results in most cases as to how effective or how extensive the decontamination was. Table 4-5 addresses the decontamination procedures that have been performed. Further information pertaining to the available Thiokol decontamination plans are located in **Appendix D**.

**TABLE 4-5  
DECONTAMINATION PROCEDURES PERFORMED ON BUILDINGS**

BLDG #	ELEC	FLASH	DECON 1.1	DECON 1.3	DISPOS 1.1	DISPOS 1.3	ASB	PROC.HAZ ANALYSIS	LEAD
7602	X	X		X		X		X	X
7618				X		X		X	
7651				X		X		X	X
7652			X	X	X	X		X	X
7653*									
7654			X	X				X	
7662	X	X	X	X	X	X	X	X	
7663			X	X	X	X		X	
7665								X	
7667	X	X	X	X	X	X		X	X
7680			X	X				X	
7681								X	
7682&A								X	
7683			X					X	
7684			X	X			X	X	

7726	X	X		X		X		X	X
7738					X		X		
7739	X	X	X	X	X				

**\* NO DECONTAMINATION PERFORMED**

To check the potential effectiveness of the decontamination and to attempt to determine if any explosive contamination was still present a selected number of buildings were checked with an Expray Explosive Indicator Test Kit. This simple to use, field kit allows testing to determine the presence of various types of explosives, it does not indicate the amount or strength of the explosives only its presence and general type *i.e.* Polynitroaromatics (Group A, TNT, DNT, TNB, Picric Acid, Lead Styphnate, etc., Nitratesters, Nitramines (Group B, Semtex, RDX, HMX, PETN, EGDN, Tetryl etc.) Inorganic Nitrate Compounds (Group C, Ammonium Nitrate, Potassium Nitrate, Black Powder etc.) Unfortunately it does not detect Ammonium Perchlorate or AP which is a major component of most propellants for rockets and missile motors.

The results indicate in some areas of the selected buildings a presence of Group B and Group C explosives. The buildings include 7653 contaminated with MOCA along with buildings 7654 and 7662 both containing Group B and C contamination.

## **BUILDINGS TO BE DEMOLISHED**

Buildings without known explosive hazard/use.

7300 Area	7500 Area	7600 Area		7700 Area
7340A	7572	7605	7655	7721
7361	7574	7606A	7656	7728
7362		7614	7657	7729
		7615	7658	7734
		7616	7659	7735
		7617	7664	
		7618	7675	
		7641	7677	
		7642	7678	
		7647	7679	
			7685	

Buildings with known explosive hazard or use, and have been decontaminated by Thiokol.

7600 Area		7700 Area
7602	7667	7726
7618	7680	
7651	7681	
7652	7682 & A??	
7653	7683	
7654	7684	
7665		

Buildings with potential Explosive Hazards which were not decontaminated.

7600 Area	7700 Area
-----------	-----------

7653	7739
7662	
7663	

#### Buildings undetermined Explosive hazards

7500 Area		7700 Area
7568	7591	7728
7569	7597	
7589	7598	
7590		

Buildings not listed above were not considered as potentially explosively contaminated and therefore were not examined.

**4.5.2 No-Action Alternative.** The decision not to demolish the proposed buildings, particularly the buildings containing residual contamination, would potentially have negative impacts on health and safety.

**4.5.3 Selective Demolition.** Potential negative impacts would be anticipated if the buildings with residual contamination receive no management attention. This is not a viable alternative.

**4.5.4 Cumulative Impacts.** No other activities have been identified that, together with the proposed action, would have the potential for cumulative impacts to health and safety.

**4.5.5 Mitigation Measures.** Since there would be no impacts anticipated to health and safety under the proposed action, no mitigation measures are necessary.

## **4.6 INFRASTRUCTURE AND TRANSPORTATION**

**4.6.1 Proposed Action.** There are no significant impacts anticipated to infrastructure and transportation under the proposed action. There could be a significant increase in building debris being taken to the Redstone Sanitary Landfill. However, the landfill has adequate capacity to handle the potential increase in building debris. There are no utility requirements expected for demolition activities. There could also be a increase in vehicular traffic associated with the proposed action. The Arsenal's roadway network is expected to provide suitable access between demolition areas and the SWDF.

**4.6.2 No-Action Alternative.** There are no impacts to infrastructure and transportation under this alternative, since the demolition of the 76 buildings would not occur.

**4.6.3 Selective Demolition.** There are no impacts to infrastructure and transportation under the selective demolition alternative. There would be a small increase in the amount of building debris taken to the Redstone Sanitary Landfill. However, the landfill has adequate capacity to handle the potential increase of building debris.

**4.6.4 Cumulative Impacts.** No cumulative infrastructure and transportation impacts are anticipated for the proposed action in combination with other activities in the area.

**4.6.5 Mitigation Measures.** Since no infrastructure and transportation impacts have been identified for the proposed action, no mitigation measures are anticipated.

## **4.7 LAND USE**

**4.7.1 Proposed Action.** The proposed action could result in some changes in land use patterns within the ROI. The most substantial change would be the removal of the 76 proposed for demolition.. This would allow the existing land currently occupied by the buildings to be converted to other uses. Demolition of these abandoned buildings would help optimize land use on the Arsenal, consistent with good management practices and a long-range planning goals.

**4.7.2 No-Action Alternative.** There could be potential negative impacts to land use if the buildings are not demolished. Buildings would have to be maintained and secured to prevent liability issues regarding health and safety. RSA would not have the opportunity to reuse the existing locations where the buildings are placed for alternative uses in the future.

### **4.7.3**

**4.7.4 Selective Demolition.** The selective demolition alternative could result in positive impacts to land use at RSA. The removal of specific buildings could free underutilized land for future building projects.

**4.7.4 Cumulative Impacts.** There could be positive, cumulative impacts anticipated to land use under the proposed action from the standpoint of long-range planning.

**4.7.5 Mitigation Measures.** No mitigation measures are anticipated.

## **4.8 NOISE**

**4.8.1 Proposed Action.** There would be no significant impacts anticipated from noise due to demolition activities. Normal demolition and earthmoving equipment operations associated with such activities would generate noise only during demolition, which are of limited duration. Current building locations are not adjacent to sensitive noise receptors (such as endangered species, hospitals, schools). Buildings 4809 and 4810 are located in Zone III of the Arsenal adjacent to the Redstone Army Airfield which typically receives the highest amounts of noise related impacts. However, the limited duration of the proposed action in these locations will cause no significant noise impacts.

**4.8.2 No Action Alternative.** There would be no anticipated impacts from noise under this alternative, since no demolition activities would occur.

**4.8.3 Selective Demolition.** There would be no significant impacts from the selective demolition alternative. Normal demolition and earthmoving equipment operations associated with such activities would generate noise only during demolition, which are of limited duration

**4.8.4 Cumulative Impacts.** No other activities have been identified that, together with the proposed action, would have the potential for cumulative noise impacts.

**4.8.5 Mitigation Measures.** Since no significant noise impacts have been identified under the proposed action, no mitigation measures are anticipated.

## **4.9 GEOLOGY AND SOILS**

**4.9.1 Proposed Action.** There would be no impacts anticipated to geology or soils from the proposed action. There could be potential negative impacts to the soils around buildings that are demolished that had residual contamination. Good management practices for erosion control, topsoil management and revegetation are required. Siltation barriers would also be required.

**4.9.2 No-Action Alternative.** There would be no impacts to geology or soils anticipated from the No-Action Alternative.

**4.9.3 Selective Demolition.** There would be no significant impacts to geology or soils from the selective demolition alternative. There could potentially negative impacts to soils around the buildings that had residual contamination. Mitigation measures which are delineated in section 4.9.5 would be required to be followed.

**4.9.4 Cumulative Impacts.** No other activities have been identified that, together with the proposed action, would have the potential for cumulative impacts to geology and soils.

**4.9.5 Mitigation Measures.** Erosion control measures including topsoil management and revegetation of areas that are disturbed would be required. Siltation barriers around the buildings scheduled for demolition would also be required.

## **4.10 SOCIOECONOMICS**

**4.10.1 Proposed Action.** The proposed action would not be anticipated to impact socioeconomics, since the buildings are currently abandoned and contribute nothing to socioeconomics. Incidental positive impacts to socioeconomics associated with future construction projects would be expected and evaluated under the environmental documentation for those projects.

**4.10.2 No-Action Alternative.** There would be potential negative impacts anticipated if the buildings are not demolished. If the buildings remain in place, expenditures would have to be made to maintain and secure the unused buildings.

**4.10.3 Selective Demolition.** There would be no impacts anticipated to socioeconomics.

**4.10.4 Cumulative Impacts.** No other activities have been identified that, together with the proposed action, would have the potential for cumulative impacts on socioeconomics.

**4.10.5 Mitigation Measures.** Since no socioeconomic impacts have been identified for the proposed action, no mitigation measures are anticipated.

## **4.11 WATER RESOURCES**

**4.11.1 Proposed Action.** There could be significant impacts to water resources due to demolition of buildings under the proposed action. Soils that could be disturbed during demolition activities could possibly be washed into drainage ditches or low-lying areas and, potentially, into the main creeks. Erosion control during demolition activities would be undertaken with the use of hay bales and silt fencing to prevent the movement of soils via surface waters.

**4.11.2 No-Action Alternative.** If the no-action alternative is chosen, it would require that the existing buildings remain as they are at present. The buildings would remain in place and threats to water resources would not occur as long as the buildings remain intact.

**4.11.3 Selective Demolition.** There could be significant impacts to water resources due to the demolition of selected buildings at RSA under the selective demolition alternative. Contaminated soils could potentially be washed into drainage ditches or creeks adjacent to the buildings proposed for demolition. Erosion control measures further delineated in the mitigation measures section would reduce the potential impacts.

**4.11.4 Cumulative Impacts.** No other activities have been identified that, together with the proposed action, would have the potential for cumulative impacts on water resources.

**4.11.5 Mitigation Measures.** Under the proposed action or the selective demolition alternative erosion controls would need to be in place to prevent the potential runoff of contaminated water into any of the drainage ditches or waterways adjacent to any of the buildings. Siltation barriers would be required to prevent any such runoff.

#### **4.12 CUMULATIVE IMPACTS SUMMARY**

There would be positive, cumulative impacts anticipated to biological resources and land use as a result of using good management practices and long-range planning as described under the proposed action.

#### **4.13 MITIGATION MEASURES SUMMARY**

Mitigation measures under the proposed action are required for ..... The Arsenal would not remove vegetation from around demolished buildings and would revegetate areas with native hardwood tree species when demolition activities are completed, based on consultation with the Arsenal forester.

#### **4.14 INDIVIDUALS/ORGANIZATIONS RESPONSIBLE FOR OBTAINING REQUIRED PERMITS/LICENSE/ENTITLEMENTS**

The Alabama Department of Environmental Management has issued a letter of concurrence to RSA for its proposed demolition activities. There are no modifications to RSA permits/licenses/entitlements necessary.

#### **4.15 CONFLICTS WITH FEDERAL, STATE, OR LOCAL LAND USE PLANS, POLICIES, AND CONTROLS**

The proposed action would be expected to have positive impacts on existing land use and present no conflicts with Federal, regional, state, or local land use plans, policies, or controls.

#### **4.16 ENERGY REQUIREMENTS AND CONSERVATION POTENTIAL**

Anticipated energy requirements under the proposed action can be accommodated by the region's energy supply. Energy use would follow established energy conservation practices.

#### **4.17 NATURAL OR DEPLETABLE RESOURCE REQUIREMENTS AND CONSERVATION POTENTIAL**

Other than the use of equipment fuels associated with the demolition activities, no significant use of natural or depletable resources is anticipated under the proposed action.

#### **4.18 IRREVERSIBLE OR IRRETRIEVABLE COMMITMENT OF RESOURCES**

While the proposed activities would result in some irreversible and irretrievable commitment of resources such as fuel and labor, this commitment of resources is not significantly different from that necessary for everyday activities taking place on the Arsenal.

#### **4.19 BIOLOGICAL DIVERSITY**

Biological diversity (biodiversity), or the variety of life and its processes, is a basic property of nature that provides enormous ecological, economic, and aesthetic benefits. The loss of biodiversity is recognized as a major national and global concern with potentially profound ecological and economic consequences. Conservation of biodiversity is addressed by NEPA. The goal is to anticipate and evaluate the effects of Federal actions on biodiversity and to actively manage impact reduction as well as to promote restoration to previously impacted areas. Biodiversity conservation maintains naturally occurring ecosystems, communities, and native species. For the proposed action, impacts to biodiversity would not be expected. Only previously impacted areas would be effected and the Arsenal would revegetate areas where demolition activities take place with native hardwood tree species when activities are completed.

#### **4.20 ADVERSE ENVIRONMENTAL EFFECTS THAT CANNOT BE AVOIDED**

Adverse environmental effects that cannot be avoided include fugitive dust (particulate matter) and explosives and construction equipment emissions; some destruction of existing vegetation; noise from demolition activities; and soils disturbance. However, implementing the the mitigation actions listed will minimize these effects.

#### **4.21 RELATIONSHIP BETWEEN SHORT-TERM USES OF THE HUMAN ENVIRONMENT AND THE MAINTENANCE AND ENHANCEMENT OF LONG-TERM PRODUCTIVITY**

The proposed action concerns existing buildings on RSA and would not eliminate options for future use of RSA. The proposed action would be undertaken in accordance with the RSA Master Plan EA (U.S. Army Missile Command, 1994) that provides a management tool to aid in making operational support decisions by incorporating the concept of comprehensive planning. The planned demolition of the buildings is anticipated to make a positive impact to both resource conservation and the associated dollar savings in the short-term and has the potential for enhancement of long-term productivity.

#### **4.22 FEDERAL ACTIONS TO ADDRESS ENVIRONMENTAL JUSTICE IN MINORITY POPULATIONS AND LOW-INCOME POPULATIONS**

The proposed action would not substantially affect human health or the environment and would not exclude persons from participation in, deny persons the benefits of, or subject persons to discrimination because of their race, color, or national origin.

#### **4.23 CONDITIONS NORMALLY REQUIRING AN ENVIRONMENTAL IMPACT STATEMENT**

Potential impacts from the proposed action were evaluated in the context of the criteria for actions requiring an Environmental Impact Statement described in DoD Directive 6050.1,



*Environmental Effects in the United States of Department of Defense Actions*, and AR 200-2, *Environmental Effects of Army Actions*. The proposed action was evaluated for potential to:

- significantly affect environmental quality or public health and safety;
- significantly affect historic or archaeological resources, public parks and recreation areas, wildlife refuge or wilderness areas, wild and scenic rivers, or aquifers;
- adversely affect properties listed or meeting the criteria for listing on the National Register or the National Registry of Natural Landmarks;
- significantly affect prime and unique farmlands, wetlands, ecologically or culturally important areas, or other areas of unique or critical environmental concern;
- result in significant and uncertain environmental effects or unique or unknown environmental risks;
- significantly affect a species or habitat listed or proposed for listing on the Federal list of endangered or threatened species;
- establish a precedent for future actions;
- adversely interact with other actions resulting in cumulative environmental effects; and
- involve the use, transportation, storage, and disposal of hazardous or toxic materials that may have significant environmental impact.

The evaluation indicated that the proposed action did not meet any of these criteria.

## 5.0 CONCLUSIONS AND MITIGATIONS SUMMARY

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Redstone Arsenal proposes to demolish 76 pre- and post- World War II and Cold War era buildings in an environmentally conscious, consistent and effective manner. These buildings have outlived their usefulness and some contain residual munitions/chemical waste. This document would assist in tiering future environmental documents, such as Records of Environmental Consideration (RECs), as new buildings for demolition are identified.

No significant impacts are anticipated from implementing the proposed action. There would be positive, cumulative impacts anticipated to land use as a result of using good management practices and long-range planning as described under the proposed action. The only mitigation measure identified was for soils, where the Arsenal would plan to remove soil contaminated during demolition activities and control erosion during and after such activities. The Arsenal also would plan to revegetate all demolition areas with native hardwood tree species when demolition activities are completed on individual sites.

Under the no-action alternative, the Arsenal would not demolish the identified buildings. The buildings would remain in place and be maintained and secured. The no-action alternative was not considered viable, since potential negative impacts would be expected in several areas of environmental consideration. There could be potentially negative impacts to land use in the areas where the current buildings are located if the land cannot be utilized productively.

There are two important conclusions based on the evaluation in this EA. One is that conducting demolition activities on the buildings would appear to optimize planning control over land use and consequently ensure the most environmentally sound planning practices are followed. Secondly, removal of the buildings would remove health and safety risk issues to accommodate broad environmental and land management concerns on the Arsenal and in the surrounding area.

### Conclusions from Cultural Resources Report -

Demolition/destruction of the following 38 buildings can proceed with no impacts to cultural resources, and no mitigations are required:

- Huntsville Arsenal, Plant Area #2, Building 5655
- Huntsville Arsenal, Plant Area #2, CG (Phosgene) Plant, Buildings 5675, 5676
- Huntsville Arsenal, Plant Area #3, SMF Plant #1, Building 3490
- Huntsville Arsenal, Plant Area #3, Incendiary Bomb Plant, Buildings 3551, 3565
- Huntsville Arsenal, Plant Area #3, SMF Plant #2, Building 3649
- Redstone Ordnance Plant, Magazine Area, Building 7132
- Redstone Ordnance Plant, North Line, Line 5, Buildings 7602, 7605, 7606, 7614, 7615, 7616, 7617, 7618
- Redstone Ordnance Plant, North Line, Building S-7642
- Redstone Ordnance Plant, South Line, Line 4, Buildings 7572 and 7574
- Miscellaneous Cold War era structures, Buildings 3434, 3435, 4373, 4810, 7340A, 7361, 7362, A-7363, 7566, 7568, 7589, 7590, 7591, 7679, 7846
- Building 7647, Large Hydrostatic Test Tower
- Propellant Facilities, South Thiokol Area, Buildings 7596, 7597, 7598.

Demolition/destruction of the following building would result in a not significant adverse impact to cultural resources at RSA. Mitigations are recommended, as applicable.

Building 8014, Police and Fire Station, Administrative Area, Gulf Chemical Warfare Depot. Focused, intensive archival and architectural research needs to be performed for this structure. HABS Level I recordation should be performed. This research plan should provide recommendations for the building's permanent maintenance and use at RSA, and should reevaluate its eligibility for the National Register of Historic Places. This Police and Fire Station should not be destroyed or demolished, and should be permanently retained at RSA.

Demolition/destruction of the following 29 buildings would result in a significant adverse impact to cultural resources at RSA. Mitigations are recommended that would reduce this effect. With the implementation of these mitigations, demolition/destruction of these buildings would result in no significant adverse impacts to RSA cultural resources.

Buildings 7651, 7652, 7653, 7654, 7655, 7656, 7657, 7658, 7659, 7662, 7663, 7664, 7667, 7677, 7678, 7680, 7681, 7682, 7683, 7684 and 7685 Redstone Ordnance Plant's North Plant-Line 1. Historic American Building Survey/Historic American Engineering Record (HABS/HAER) recordation of Line 1 should be performed. Because of health considerations, a review should be performed to ascertain the highest level of HABS/HAER recordation that can be safely performed. Following the performance of HABS/HAER recordation these buildings can be demolished/destroyed.

Buildings 7721, 7726, 7728, 7729, 7734, 7735, 7738 and 7739 Redstone Ordnance Plant's North Plant-Line 2. HABS/HAER recordation of Line 2 should be performed. Because of health considerations, a review should be performed to ascertain the highest level of HABS/HAER recordation that can be safely performed. Following the performance of HABS/HAER recordation these buildings can be demolished/destroyed.

Demolition/destruction of the following three buildings would result in a significant adverse impact to cultural resources at RSA.

Buildings 7561 and 7565 are integral buildings of Redstone Ordnance Plant's South Plant-Line 3. They should be included in HABS/HAER recordation of Line 3, as they are integral elements of that line. These two buildings should be incorporated into and included in any future planning for Line 3, and should not be destroyed until a comprehensive decision can be made regarding Line 3's future.

Building 7641, Barracks. Additional archival and architectural research should be performed on this building to determine its specific architectural type, and recommendations for its permanent maintenance and use at RSA should be investigated. This barracks building should not be destroyed or demolished, and should be permanently retained at RSA.

### **Mitigation Measures**

As a conclusion to this environmental evaluation the following mitigation measures are recommended.

Flash/Flame all buildings which are known or suspected to have been exposed to explosive contamination utilizing procedures which employ Certipaks to verify effectiveness of the process. This is to include all sumps and drainage channels connected to the suspect/known contaminated buildings. Specific recommendations are listed below.

An evaluation of the explosive hazards involved indicates no explosive safety reason not to pre-remove asbestos containing material (ACM) prior to flashing and flaming, as long as non sparking tools, procedures and properly trained asbestos abatement personnel are utilized.

A detailed approved Standing Operating Procedures MUST be used for all aspects of the explosive decontamination phase of the building demolition.

### **Flashing/Flaming Decontamination Recommendations**

#### **A. General Recommendations**

1. Inhabited building distance MUST be observed for all personnel involved in Flashing/Flaming. Additionally, only one Explosively or suspected Explosively contaminated building should be Flashed/Flamed at the same time. Flashing and Flaming should only be performed during Lapse weather conditions.
2. There should be no significant impacts to health and safety due to Flashing/Flaming decontamination and disposal potential impacts should be minimized using established safety procedures.
3. There should be no existing natural gas, water, wastewater treatment or solid waste disposal requirements at the proposed decontamination/disposal sites.
4. Controlled temperature methods should be used in decontamination of equipment and facility hardware. Any contaminated materials and equipment to be sold for scrap must be subjected to high temperature burning/flashing to assure complete decontamination IAW TB 700-4.
5. No metal scrap or concrete blast walls which have been contaminated with explosives/propellants or harmful chemicals should be released for general use unless flashed or open burned and certified to be free of hazardous contamination.
6. After Flashing/Flaming decontamination, a visual inspection should be made and samples taken to determine the extent of decontamination.
7. The ground within 50 feet of buildings where an explosive material was handled should be carefully inspected. If the soil is contaminated with explosive material to such an extent that a fire or explosive hazard exists, the layer containing the explosive material should be wetted and scraped, using non-sparking tools and the hazardous material disposed of by burning at an approved burning ground. If acid contamination is suspected around building foundations, the soil should be excavated and thoroughly neutralized with 7% soda ash solution.

#### **B. General Safety Precautions**

1. All precautions and recommendations of Army TB 700-4, (Appendix ?) Para 2-6 should be closely followed.
2. Decontamination procedures of Army TB 700-4 (Appendix ?) Chap 3 should be highly considered prior to decontamination by open burn or flashing procedures.

3. Prior to Flashing/Flaming decontamination operations, meteorological data, such as wind velocity, approach of storms, precipitation, and cloud cover should be considered. Routine Flashing/Flaming operations should not be conducted under adverse weather conditions.
4. Typical decontamination exposure to chemical/physical stresses include noise, heat, carbon monoxide, oxides of nitrogen, minimizing radiation, eye hazards, and systemic poisoning from nitro-based explosives/propellants. Personnel are provided with the appropriate personal protective equipment (e.g. eye protection, hearing protection, respiratory protection) to minimize those hazards.
5. Buildings containing explosive/propellant wastewater sumps should be inspected to determine if sediment/sludge has been decontaminated by flashing/burning and certifying decontamination, dismantling and/or demolition of the sump and contaminant area. Removal of the sump sludge/sediment and burning the sludge/sediment should be verified prior to open burn decontamination. Sump contaminant concrete should be inspected and verified that it is free of explosive/propellant contamination.
6. Contaminated solid beneath building sumps and beneath explosive/propellant facilities will be removed after decontamination, dismantling, and/or demolition.
7. Pretreatment of explosive/propellant facility painted walls or concrete flooring, reinforced concrete blast walls (divider walls), process equipment, process piping (excluding asbestos insulated piping which should be pre removed per EPA requirements) ducting, cat walks, ladders, stairs and platforms, building structural steel and inside facility walls should be verified that low flow, high pressure water washing decontamination has been performed.
8. Decontamination of non-sealed electrical equipment (all power terminated), steel gutter, and some building structural steel and miscellaneous material and scrap inside contaminated facilities should be verified.
9. Offsite disposal of decontaminated metal material must meet requirements of “xxxxx” (5x) decontamination IAW Army TB 700-4, para 2-2c(3) of Chap 2.
10. Disposal of contaminated blast walls (dividing walls) and concrete flooring should be disposed of at RSA approved disposal/landfill. Wipe samples and paint samples should be taken prior to decontamination.
11. Collection and onsite treatment of wastewater generated by any decontamination processes should be collected and disposed of by RSA approved disposal regulations.
12. Collection of residual explosive/propellant contaminated solids/materials should be disposed of by burning at RSA approved burning grounds.
13. Collection and testing of residual ash from open burn or flaming decontamination should be performed and verified. This material will be disposed of at RSA approved landfill.
14. Removal of all asbestos contaminated equipment and materials will be performed prior to decontamination by open burning IAW Federal, state, and RSA regulations. These materials may also contain explosive/propellant residue.

15. Removal of any possible low-level PCB contaminated facilities or soil will be removed IAW Federal, state and RSA regulations.
16. Recommend that paint samples in explosive/propellant facilities be collected and analyzed for lead contamination to prevent airborne contamination. Refer to appropriate Material Safety Data Sheet (MSDS)
17. Personnel may be exposed to diesel fuel during open burn decontamination operations. Personnel should be familiar with appropriate Material Safety Data Sheet (MSDS).
18. A select list of contaminants which are of greatest occupational health and safety concern should be identified. **Concern??** shall be established by evaluating contaminants potential for causing exposure above OSHA Permissible Exposure Limits (PELs) or ACGIH TLVs.

### **C. Hazards**

The contractor shall address the following potential hazards which may be encountered during site work.

1. Chemical, physical, and safety hazards of concern for each site task and/or operation to be performed. A hazard/risk analysis should be performed and added to the Site Safety and Health Plan (SSHP).
2. Exposure to potentially explosive/propellant waste hazards during all phases of open burn decontamination (including removal, handling, transport, and burning of any contaminated materials, sump sludge/sediment, all phases of demolition, and any flaming operations).
3. Exposure to toxic chemicals during demolition and decontamination, removal, transport, and burning/flaming of sump sludge/sediment.
4. Pathways (downwind hazards) for hazardous substance disposition.
5. Chemical, physical, and toxicological properties of the contaminants on the select list, sources and pathways of employee exposures, anticipated onsite and offsite exposure level potentials, and regulatory (Federal, state, and RSA) protective exposure standards.
6. Exposure to hazardous substance brought onsite for the purpose of executing these decontamination/demolition procedures. In such cases the contractor shall comply with the requirements of 29 CFR 1910.1200 and 29 CFR 1926.59, Hazard Communication.
7. Exposure to asbestos (unless removed), silica, dust, lead PCBs, tetra, and propellants in explosive class 1.3.

## 6.0 LIST OF PREPARERS

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## **7.0 INDIVIDUALS/AGENCIES CONSULTED**

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### **7.1 AGENCIES/ORGANIZATIONS SENT COPIES OF THE ASSESSMENT**

As part of the CEQ Regulations on the National Environmental Policy Act, the U.S. Army Missile Command is circulating the Environmental Assessment for the Demolition of 76 Buildings on Redstone Arsenal to the following agencies, organizations, and individuals:

Alabama State Historic Preservation Office, Montgomery, Alabama

### **7.2 INDIVIDUALS AND AGENCIES CONTRIBUTING TO THE PROJECT**

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- a. NEPA 40 CFR 1500-1508
- b. DoD 6050.1
- c. AR 200-2
- d. 40 CFR 265.382
- e. AMC-R-385-100
- f. Local SOPs as required
- g. Open Burn personnel training requirements
- h. OSHA 29 CFR 1910
- i. Solicitation DACA67-96-R-0001 Umatilla AD,OR; Seattle District, USACE Oct 1965
- j. Solicitation DACA63-97-B-0026 Ft.Wingate, NM; Ft Worth District, USACE May 1997
- k. Article, Eng. News Review 09/04/95 page 21," Picatinny ignites new era"